JUNE 21, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

TRANSPORTATION IN DISTRIBUTION

Integrate Your Distribution

. . . And find a new industrial frontier in your own backyard — page 113

PERSONNEL IN DISTRIBUTION

No. 5 in 1954 Management Series

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for want of a horse the smith was lost

THE blacksmith shop was a busy place . . . when horsepower came "on the hoof". But when the first gasoline engine coughed and sputtered into life, the days of the village blacksmith were numbered.

That's progress. Spurred on by competition, it spells success for some things, obsolescence for others.

In today's highly competitive market the search for *new* and *better* methods of production is an urgent one. It's a problem that calls for fresh thinking and sound experience.

When it comes to precision finishing, we would like to show you how Heald engineering and the latest Heald equipment can help you build a better product at lower cost. New developments in automation, way-type and transfer Bore-Matics, inte changeable tooling and internal grinding metho may well be the answer to your particular pro lems.

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ddition, we produce standard manholes and covers, hand holes and covers, flue holes, pipe flanges and
ar flanges. The nearest Bethlehem sales office is at your service.

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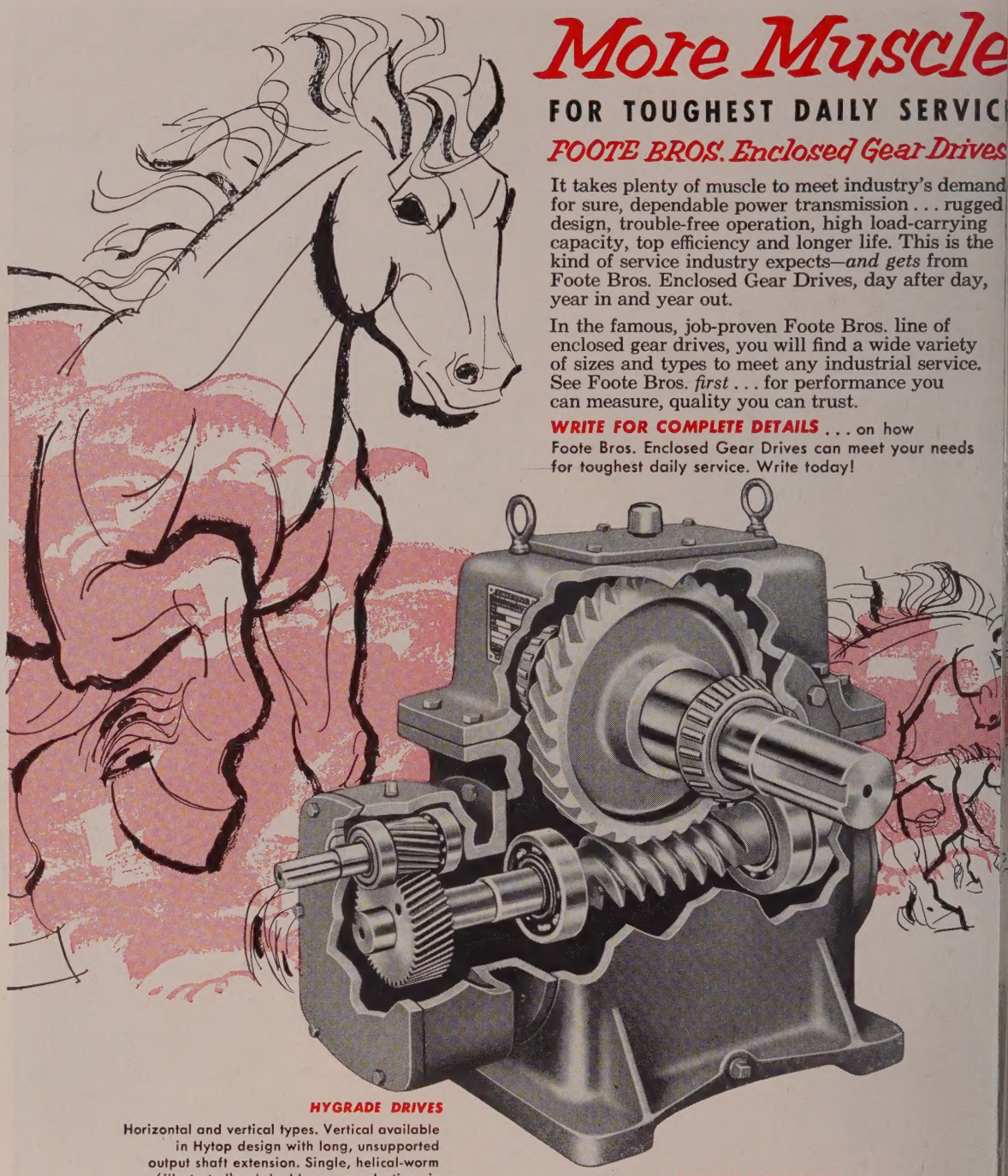
It takes plenty of muscle to meet industry's demand for sure, dependable power transmission . . . rugged design, trouble-free operation, high load-carrying capacity, top efficiency and longer life. This is the kind of service industry expects—*and gets* from Foote Bros. Enclosed Gear Drives, day after day, year in and year out.

In the famous, job-proven Foote Bros. line of enclosed gear drives, you will find a wide variety of sizes and types to meet any industrial service. See Foote Bros. *first* . . . for performance you can measure, quality you can trust.

WRITE FOR COMPLETE DETAILS . . . on how Foote Bros. Enclosed Gear Drives can meet your needs for toughest daily service. Write today!



HYGRADE DRIVES

Horizontal and vertical types. Vertical available in Hytop design with long, unsupported output shaft extension. Single, helical-worm (illustrated)and double-worm reductions in ratios up to 4108 to 1; capacities up to 260 h.p.

FOOTE BROS.

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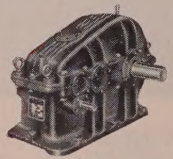
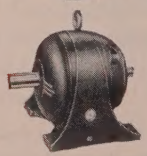
Manufacturers of Duti-Rated Lifetime Gears, standard gears, enclosed gear drives of all kinds, gear motors, aircraft-quality gears and actuators, and special machinery . . . the world's finest since 1859.



MAXI-POWER DRIVES

Compact housings, specialized heat-treatment for gearing and improved accuracy of gear tooth generation mean longer, trouble-free performance. Ratios up to 360 to 1; capacities up to 1550 h.p.

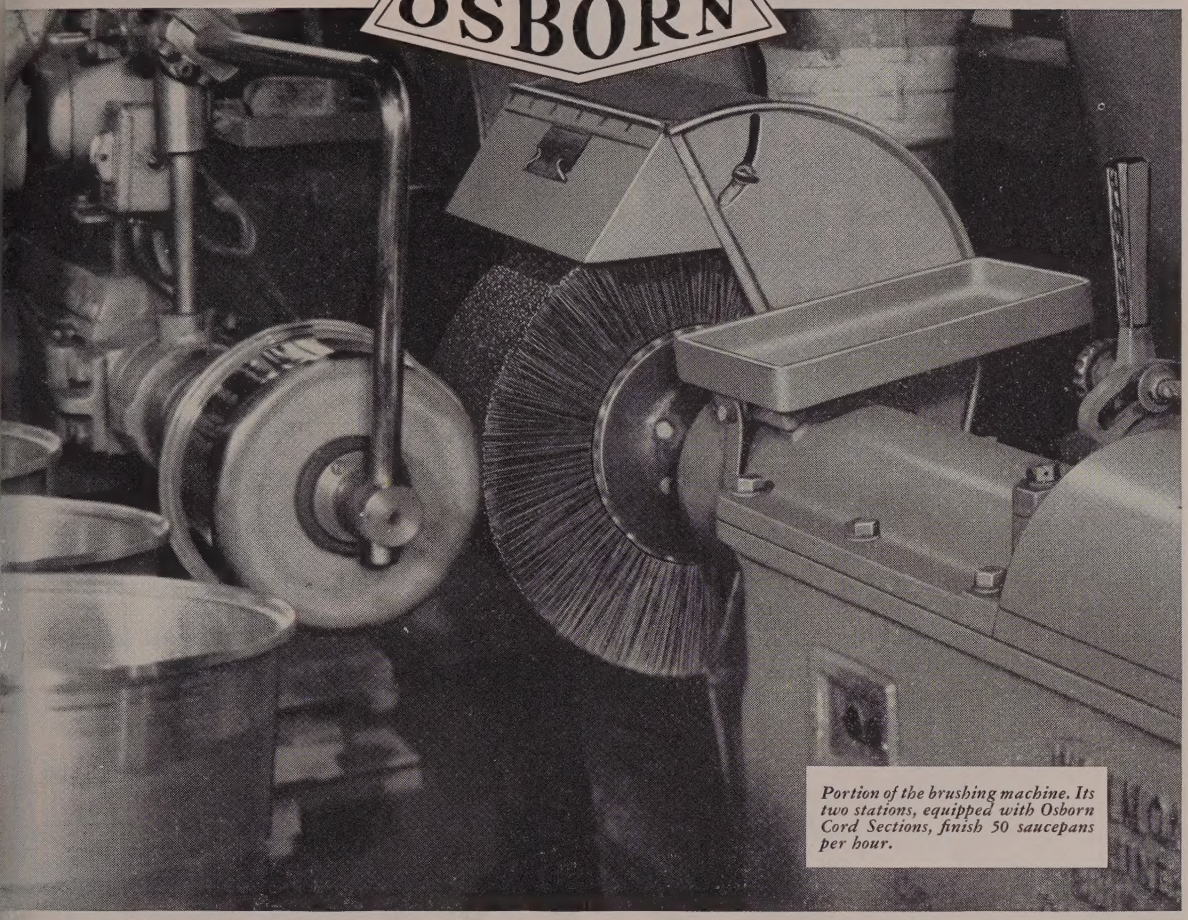


LINE-O-POWER DRIVES

Incorporate higher capacity, space saving, longer life *Duti-Rated Lifetime Gears*. Available in double and triple reductions with ratios from 5 to 1, up to 238 to 1; capacity range from 1 up to 200 h.p.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4545 SOUTH WESTERN BOULEVARD • DEPT. I • CHICAGO 9, ILLINOI

OSBORN



Portion of the brushing machine. Its two stations, equipped with Osborn Cord Sections, finish 50 saucepans per hour.

Recipe for cooking up a 33% saving

HERE'S how to make stainless steel shine in *two* steps where it formerly took *three:*

This manufacturer of stainless utensils used these operations: (1) Rubbing with 220 oiled grit. (2) Rubbing with 320 oiled grit. (3) Buffing. The **O**sborn **B**rushing **A**nalyst suggested the use of Osborn Cord Sections with stainless steel cut and color compound instead of operations (2) and (3).

Results: The finish is perfectly uniform. Finishing time has been cut 33%.

This is typical of savings being made in finishing of many materials and many products with Osborn Push-Button Brushing methods. Find out how *you* can save. Call your nearby **OBA** or write *The Osborn Manufacturing Company, Dept. G-20, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

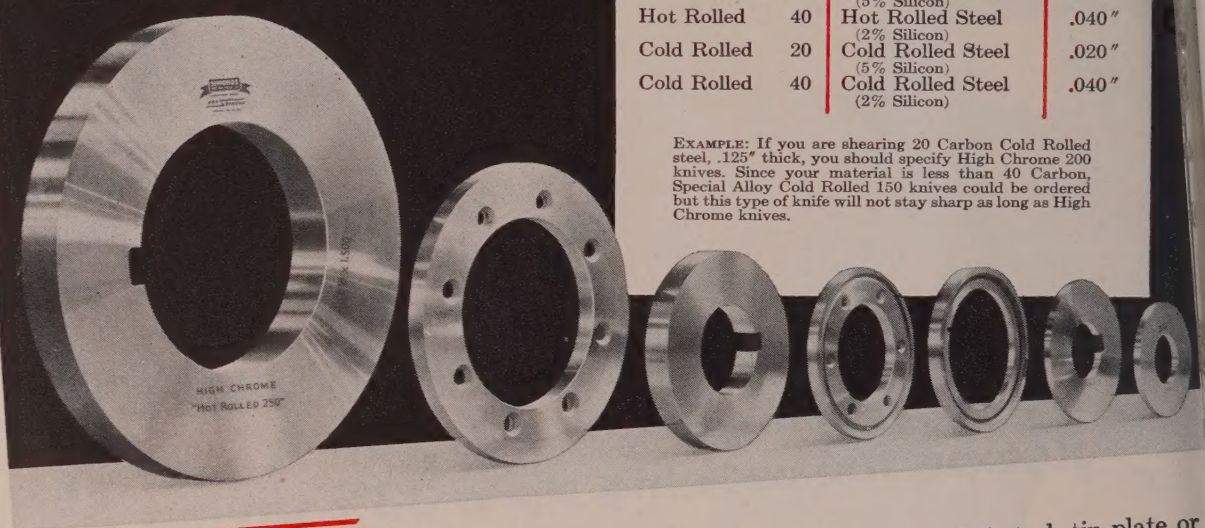
OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

SIMONDS Shear Knife SELECTOR CHART

helps you pick the BEST for your job!

Name and Number of Knife		For Shearing	Max. Thickness in Thousandths
High Chrome Steel			
Hot Rolled	150	Hot Rolled Steel	.150″
Hot Rolled	250	Hot Rolled Steel	.250″
Cold Rolled	100	Cold Rolled Steel	.100″
Cold Rolled	200	Cold Rolled Steel	.200″
Tin Plate	50	Tin Plate	.050″
Non-Ferrous	65	Non-Ferrous Metals	.065″
Non-Ferrous	100	Non-Ferrous Metals	.100″
Special Alloy Steel			
Hot Rolled	100	Hot Rolled Steel (40 Carbon or under)	.100″
Cold Rolled	65	Cold Rolled Steel (40 Carbon or under)	.065″
Cold Rolled	150	Cold Rolled Steel (40 Carbon or under)	.150″
Non-Ferrous	100	Non-Ferrous Metals	.100″
Non-Ferrous	150	Non-Ferrous Metals	.150″
Non-Ferrous	200	Non-Ferrous Metals	.200″
Non-Ferrous	375	Non-Ferrous Metals	.375″
High Speed Steel			
Hot Rolled	20	Hot Rolled Steel (5% Silicon)	.020″
Hot Rolled	40	Hot Rolled Steel (2% Silicon)	.040″
Cold Rolled	20	Cold Rolled Steel (5% Silicon)	.020″
Cold Rolled	40	Cold Rolled Steel (2% Silicon)	.040″

EXAMPLE: If you are shearing 20 Carbon Cold Rolled steel, .125″ thick, you should specify High Chrome 200 knives. Since your material is less than 40 Carbon, Special Alloy Cold Rolled 150 knives could be ordered but this type of knife will not stay sharp as long as High Chrome knives.



RED STREAK

FORGED ROTARY SHEAR KNIVES

Whether you're shearing hot or cold rolled steel, tin plate or non-ferrous metals . . . separately or in gang slitting operations . . . Simonds tailors a "Red Streak" Rotary Shear Knife specifically for your application. Made in 3 different Simonds own electric furnace steels, these job-engineered knives give you cleaner, higher quality slitting . . . and longer service between sharpenings.

Forged for maximum strength and resistance to wear, as well as to prevent nicking or breaking out under shearing pressure, "Red Streak" Shear Knives are precision ground to close tolerances and a low micro-inch surface finish.

These are all "reasons why" Simonds Shears give better results in the long run . . . why it will pay you to send for the free "Shear Selector Chart" and to place your next Shear Knife order with Simonds.

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Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

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Editorial, Business Staffs—16. Advertising Index 211. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

ublished every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. ubscription in the United States and possessions, Canada, Mexico, Cuba, Central and South merica, one year $7.50; two years $15; all other countries, one year $20. Single copies (current sues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the post- ec. 34.64 P. L. & R. Copyright 1954 by Penton Publishing Co.

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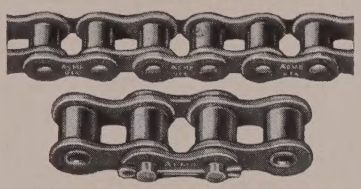
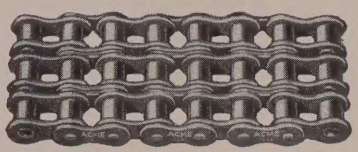
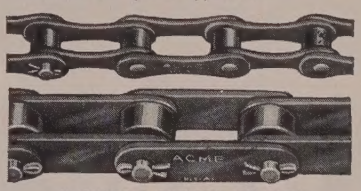


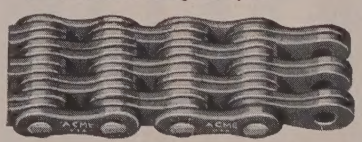
STANDARD ROLLER CHAINS
Available in pitches from 3/8" to 2½" riveted and detachable type.



STANDARD MULTIPLE WIDTH
Multiple widths of six strand or wider available for special application.

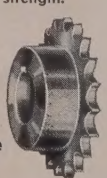


DOUBLE PITCH CHAIN
For use in slower speed power transmission and material handling conveyors.



CABLE CHAINS
Acme Cable Chains are furnished in a variety of pitches, widths and strength.

SPROCKETS
Acme Sprockets are available in a wide range of sizes, in all types.



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Write Dept. 10-J for new illustrated 76 page catalog on use and application of roller chains and sprockets.

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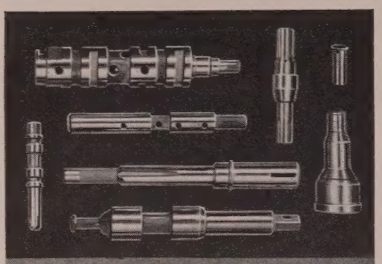
HOLYOKE MASSACHUSETTS



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behind the scenes

Wanna Guide?

Put on our coveralls one day last week and went ground-hogging through the storage room in the basement of the old paper mill.

There bundled up as pretty as you please were five cartons of "Stainless Steel Buyers Guides" and an equal number of "Machine Tool Buyers Guides." Sadly enough, we have been telling folks for more than two months that we were plumb out of both of these valuable reference books. How were we to know that some zealous stock room clerk had been practicing his bundling technique in secret.

We're getting copies out *toute de suite* to all those persons who requested them. Those who need and want copies should send for them pronto. First come, first served as long as they last. One dollar is the tariff.

That's Our Boy John

See that chap sitting alongside Ike? That's not the minister from Timbuctoo or the Right Honorable Whatchma Callit from Whereszat. That's a man well known to all Penton folks and indirectly, but just as importantly, known to you. It's John Thomas of the Penton Press Division of the Penton Publishing Co.; one of the men who helps supervise the changing of the written word into the printed word for you each week.

A year ago, John was elected president of the Federation of Lutheran Clubs, a national organization composed of local clubs throughout the nation. The ninth annual convention of the federation was held at the Mayflower Hotel in Washington during part of the last week in May.

A high point in the convention program occurred Friday morning, May 28, when the officers and members of the board of governors of the federation and members of the convention committee of the Washington Lutheran Club met at 9:00 in the morning in the executive office of the White House for a conference with President Eisenhower. As leader of the visiting group, John explained to the President the work of the federation and some of the problems discussed at its Washington convention. In responding to John's remarks, the President touched upon some of the major problems now confronting the nation and congratulated John and his associates for promoting among the laymen of religious groups a deeper sense of responsibility for higher moral and spiritual standards during the present period of tenseness. A group photograph was taken showing John seated beside President Eisenhower, with the other Lutheran representatives standing behind them. We took the liberty of editing out other group members since our boy John is the one we wanted you to see.

Best You Should, Joey . . .

Got into a verbal wrestling match with a friend the other p.m. He was making noises to the effect that he was too busy to read anymore. Hadn't dipped into his last few copies of the "good" book and didn't rightly know when he'd find the time to do it.

"Would you take your lily-white body to a doctor who didn't read the latest medical journals or attend periodic refresher conferences or critiques?" we asked him. "Would you trust your legal problems to a lawyer who wasn't hep to the latest court decisions—or your children's education to teachers who didn't have time to keep informed on the current developments in their particular field of learning?

"Why, then," we continued, "are you so willing to entrust your business to a fellow who *hasn't time* to keep informed on the news, technical and market developments which can mean a lot or a little money in your pocket?"

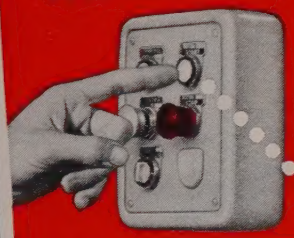
"Best find time to read, Joey boy. The future of your business may depend upon it," we told him.

Don't you agree?

Shrdlu

(Metalworking Outlook—Page 69)

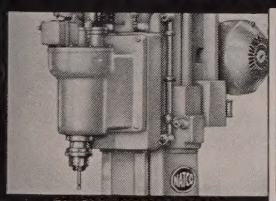
NEW FEED and CONTROL MECHANISM *increases production!*



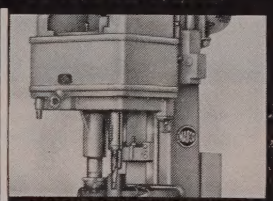
D225H MACHINE

AVAILABLE WITH

- ✔ SINGLE SPINDLE HEAD
- ✔ ADJUSTABLE SPINDLE HEAD
- ✔ FIXED CENTER SPINDLE HEAD



SINGLE SPINDLE HEAD

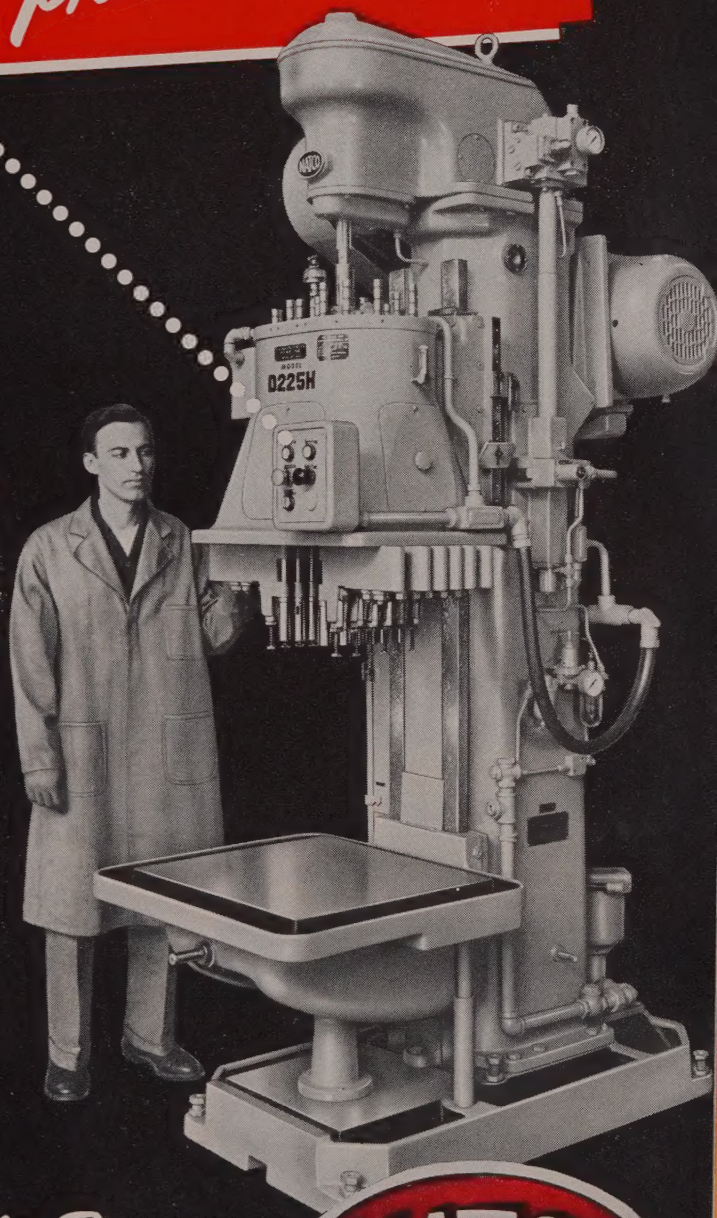


FIXED CENTER SPINDLE HEAD

...for medium size work new push button control reduces costs by speeding operations

POSSIBLE FEED CYCLES

1. STANDARD CYCLE — Rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, rapid reverse, stop.
2. JUMP FEED CYCLE — Additional Equipment. Rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, rapid reverse, stop.
3. TIME DELAY REVERSE CYCLE—Additional Equipment. Rapid traverse forward, 1st or coarse feed forward, 2nd or fine feed forward, dwell against positive stop for predetermined time, rapid reverse, stop.



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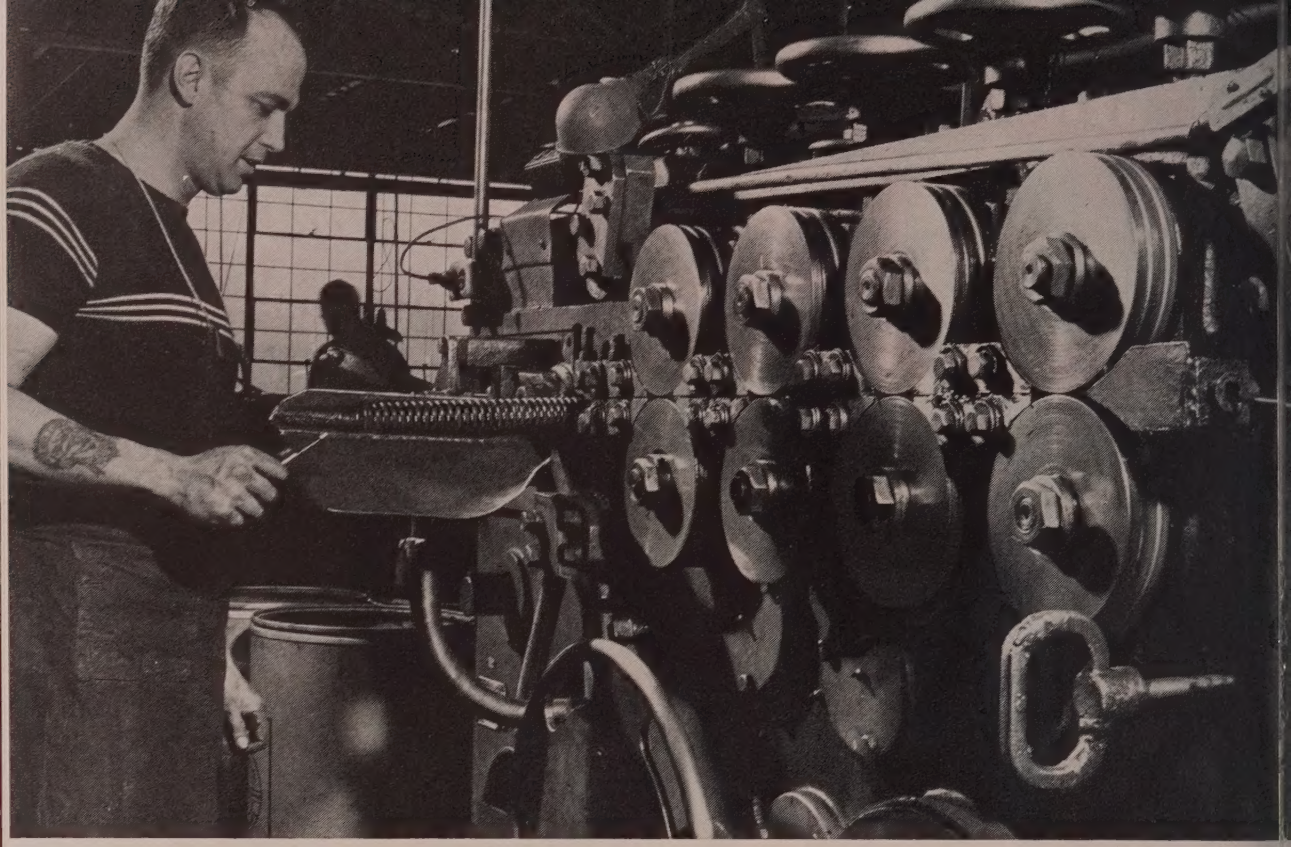


To Make Auto Hood Hinge Springs, straight wire goes in one end (note wire extreme right), a coil spring comes out the t on this high-speed coiler at the Chelsea Spring Division of Rockwell Spring & Axle Co. at Chelsea, Michigan. Here's . . .

How Pittsburgh Steel Helps Chelsea Spring Divisi Produce High-Quality Springs By The Millions

Intricate Springs, like these automobile trunk latch springs, are less than one inch long yet contain 7 inches of .025-inch diameter music spring wire. They are produced at the rate of about one each second from a No. 1 Sleeper-Hartley torsion coiler at Rockwell's Chelsea Spring Division.

Mass-producing intricate steel springs of many sizes and types, each for a specific function, is a complex job. Here's how Chelsea Spring Division of Rockwell Spring & Axle Co., one of the country's largest spring makers, turns out high quality steel springs by the millions for automotive, appliance, aircraft, and many other industries.

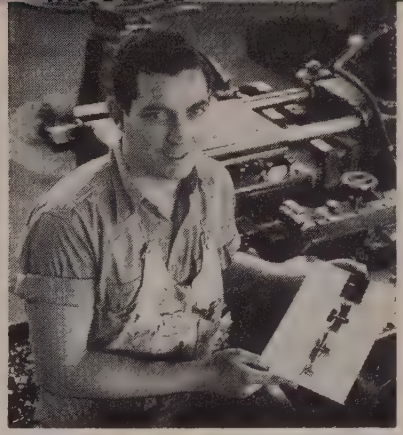
First, Chelsea has experienced engineers and production men who know how to design and produce springs to meet customers' exacting specifications. Second, Chelsea has the finest, latest model, high speed automatic machines to do the actual forming, shaping, producing. Third, Chelsea uses only the finest quality steel wire like that produced by Pittsburgh Steel Company. So, the secret of Chelsea's success is a c bination of expertly trained pri tion men, the best machines, ar finest raw materials.

Pittsburgh Steel Company, c the country's leading produce high quality steel wire, sup Chelsea with a wide range of products—the kind that can b pended on to meet the require of high speed production. The has to meet specifications ex and it must be absolutely un from coil end to coil end, and coil to coil. The slightest vari from absolute uniformity in the can cause jamming in the mach production delays, and costly j tions.

Pittsburgh Steel Company been a wire producer for ov

(Advertisement)

Keep Auto Upholstery Smooth sands of wires are formed hourly at sea Spring Division on a Baird No. ur slide machine from .047-in. dia. n MB spring wire. Finished wires conform to a tolerance of plus-or- s .010 on length and form.



Chrome Trim and Ornaments on Your Car are held tightly in place by Rockwell-produced spring clasps like these made from high quality, cold rolled annealed and spheroidized steel strip from Pittsburgh Steel's Thomas Strip Division, Warren, Ohio.

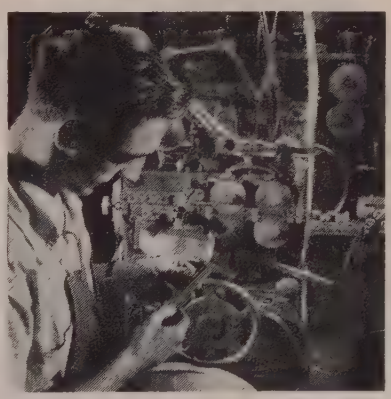
Springs for Your Riding Comfort— These automobile seat springs are shown here emerging from zig-zag forming machines (background) at Rockwell's Falls Spring Division, Detroit. After heat treating and tempering the springs are ready for assembling to auto seat frames.

rs. The long experience of its mill and metallurgists at steel-mak- from the blast furnaces and open rths through the final wire draw- and finishing operations, goes every pound of wire that is made. n Pittsburgh Steel wire mills at nessen, Pa., some of the most lern in the industry, are pro- ed such grades as bright basic ; low, medium and high carbon; types of annealed wire; ACRS wire; cold-heading wire; oil- pered spring wire; and shaped .

he wire mills of the subsidiary nson Steel & Wire Company at rcester, Mass., producers of fine specialties, have just completed oroughgoing modernization. Its ge includes aircraft cord wire, ature binding wire, wire for shes, metal stitching, hose rein- ement, stapling wire, bobby pin , tire bead wire, rope wire, oil pered and MB hard drawn spring , and music spring wire right n to sizes as fine as a human hair.

he Thomas Strip Division, War- Ohio produces a line of cold- ed strip steel electrolytically coated with zinc, copper, brass, el, lead alloy; hot dip tin and l-alloy—also annealed spring l like that shown in photo (sec- from right, above).

he combined operations of these ts offer the spring maker an un- usually broad diversity of high quality steels to select from, assure him fast service to meet a wide variety of applications. Pittsburgh Steel's operations are geared to mesh smoothly with the customers' production line requirements. Oil tempered spring wire, for example, is stocked at Monessen for immediate shipment. If, like Chelsea, you use steel wire in your manufacturing operations, why not talk to a man from Pittsburgh Steel? You will find him at one of the company's district offices near you, or at the home office. A phone call or a letter will bring prompt action. He will be glad to show how you can get the full benefits of Pittsburgh Steel's ability to make the kind of wire you want and deliver it when, how, and where you want it.



A Small Spring can often be vital to the operation of a large unit in today's automobile. These relief valve springs for automatic transmissions are a good example. When compressed to 1.625 inches, the spring must develop a force of 4 pounds with a tolerance of plus-or-minus .02 pounds. Each of these springs made at the Chelsea Spring Division of Rockwell Spring and Axle Company, Chelsea, Mich. must be tested to assure perfect operation.

"Everything New But The Name"

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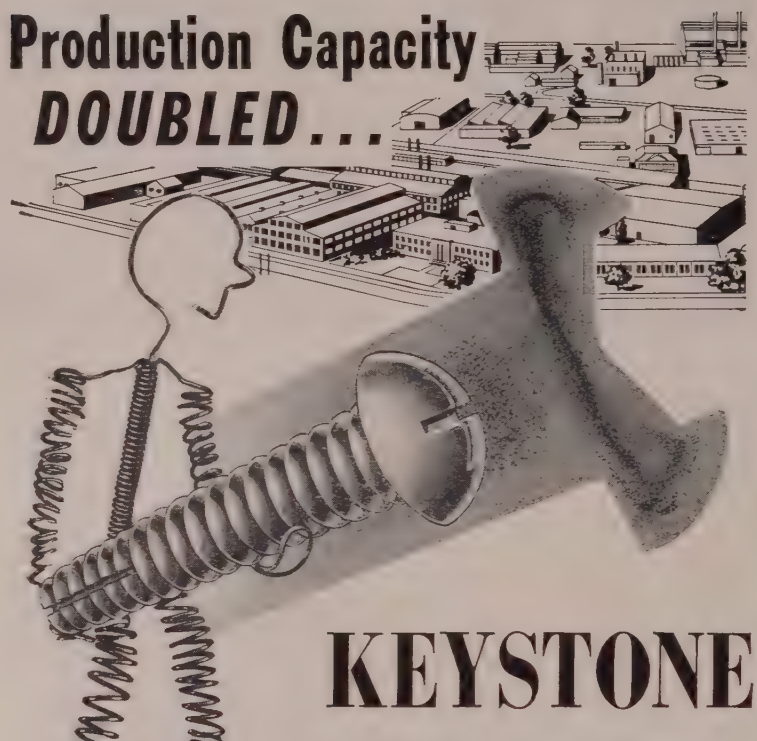
Production Capacity DOUBLED...



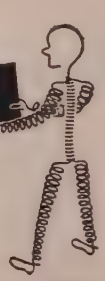
KEYSTONE

"SPECIAL PROCESSED"
COLD HEADING WIRE
for

- Phillips Head Screw
- Clutch Head Screws
- Cross Recessed Head Screws

The unique upsetting qualities of Special Processed wire are recognized by licensed recess head screw manufacturers across the nation. The excellent flow properties of this superior cold heading wire together with its structural soundness give this wire unsurpassed performance on difficult cold heading jobs.

To meet the ever-increasing demand of new customers while continuing to serve its present customers, Keystone is doubling its production capacity on Special Processed wire. We'll be glad to show you how Special Processed wire can improve the quality of your product and lower your production costs. Write us for additional information.



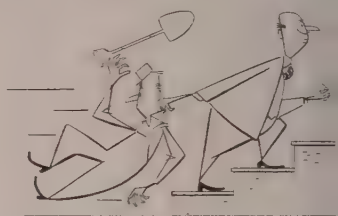
INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

LETTERS
TO THE EDITORS

Shop Apprenticeship vs Colleg

Referring to your article, "Appre tices: Assurance of Skilled Labor T morrow" (May 3, p. 65), I, too, som times wonder where the apprentices a to come from. The unions have t brighter apprentices and younger m chanics so hog-tied that manageme either won't, or is afraid to, move the younger men into executive training. S I would go out of my way to talk again any apprenticeship program but wou instead devote my efforts to selling college education.



At the present time young mechani who have recently completed their a prentice training in the Washington ar are being laid off.

I should like to relate the case of m own son: After being discharged fr the Navy and completing his high sch education, he applied for apprenti training in the U. S. Naval Gun Facto Washington. He entered his apprenti training for a molder in June, 1948, a *permanent employee.*

In September, 1950, the Whitten ri was passed by the Congress which st ed that any federal employee who a vanced to a higher grade of pay wo automatically lose his permanent sta and would thereafter be classed as *temporary* employee. This was a sche to prevent the administration in po then from packing Civil Service r with permanent employees who would difficult to lay off in event of reduct in force. This rider further provided t the *permanent* employee could either cept or reject advancement and, if accepted, he would automatically d back to his former *permanent* rating the event of reduction in force.

In June, 1952, my son completed apprenticeship and was advanced third class molder, *temporary* appo ment. The joker is that since reduct in force has now caught up with h he has been offered a helper's ratin the char force gang. The Civil Ser Commission concurs in this action cause their interpretation is that he is equivalent to any apprentice. My would gladly take a reduction to mold helper for the time being in order finish out his term in engineering at University of Virginia Extension Sc But the char force job is just a l more than either he or I can recon

Since receiving his reduction in f notice he has visited several foun in a number of cities and has tri sell himself without success.

I admit that the future of indu with respect to mechanics is very

(Please turn to page 12)

Mechanical Charging...

Whiting will engineer the complete charging system for you—large or small—simple or complex. You'll *increase* production—save money!

YOUR GREATEST COST-CUTTING OPPORTUNITY!

Mechanical charging is today's biggest cost cutter! The average foundry *handles 100 tons* of material to turn out *one* ton of finished castings. With a fully mechanized Whiting system, two to four men can make up and charge 20 to 50 tons per hour. Hand methods require 18 to 20 men to do the same work.

So save manhours and reduce labor costs *now*. Provide better working conditions and improve melting *now*. *Do it all with a Whiting Mechanical Charging System engineered to your specific needs.*

WHITING CORPORATION

HARVEY, ILLINOIS

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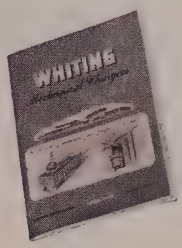

Write today for Bulletin FY-153 . . .

a 36 page booklet that gives complete information on all types of Whiting Charging Systems.

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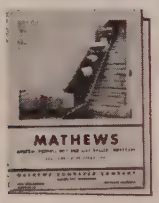
one of the many types of high-quality power and gravity conveyers in the MATHEWS Line



The Belt Conveyer is one of the most efficient and commonly applied types of material handling equipment. It can be installed level, inclined, declined, or in a combination of these designs, and will operate well at any reasonable speed under complete control. The full line of Mathews Belt Conveyers ranges from standardized, general purpose units to highly complex, continuous flow conveying systems. When you have package handling problems, call in your nearest Mathews representative. Have him tell you more about Mathews Belt Conveyers and the other types of equipment in the complete Mathews line.

● Write for Bulletin G.P. 53, giving details on the Mathews General Purpose Belt and Live Roller Conveyers . . . or for Catalog No. 853, featuring numerous installations that could possibly offer a solution to your conveying problem. Both are yours for the asking.

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CANADIAN DIVISION . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

LETTERS

(Concluded from page 10)

couraging. In saying that, I am looki back on over 40 years experience in va ous phases of the ferrous and nonferro industries. However, let's not kid ou selves nor be kidded by the Departme of Labor, particularly the Bureau of A prenticeship whose function to this wr er is extremely questionable as a nec sary bureau of the federal governme

Herbert M. Fraz
649 No. Illinois
Arlington, V

I thought your article on apprenti training was an excellent one and ho that it will stimulate greater interest apprenticeship. We have been maki rather detailed studies of our experien with our apprentice program since Wo War II. We can emphatically refu every one of the alleged "reasons" so industrial organizations advance t their failure to have apprentice p grams.

K. A. Mo
American Steel & Wire Divis
U. S. Steel Co
Clevela

Leaks Stopped in Corvette

There is considerable difference b the experience related in "Mirrors Motordom" (May 3, p. 70) and th of the road tester in *Road and Tra* magazine (June, 1954).

Says R&T: "Corvette top is ne fairly easy to set up and did not le in a heavy rainstorm. During the ra storm the top and very practical s curtains were completely effective, lt the leading edge of the door openi leaked. The slight drip was, howev useful in putting out cigarettes. As from the leak, the fiberglass bo showed absolutely no fault."

Says STEEL: "Never have we contact a car that leaked more water in m places than a Corvette."

W. F. Woo
Woolery Machine
Minneap s

● *A check with the Chevrolet Engine ing Department reveals that the lea ing trouble which was very evident the Corvette driven by STEEL's edit has been corrected in later models. t was apparently a model of the la type which the road tester for R and Track magazine drove.—ED.*

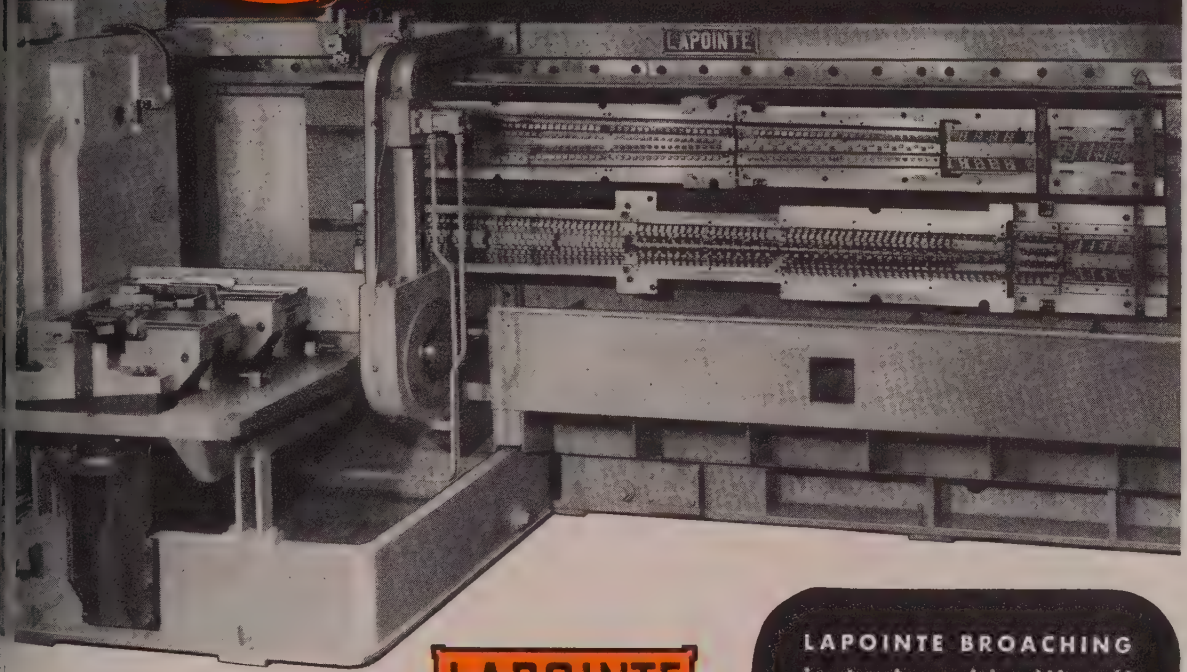
Requesting Research Source

One of your recent articles, "Copp Base Alloys: Toughness and Hardn Have Been Added" (May 10, p. 12 mentioned the Copper & Brass Resea Association. Could you give us th address?

F. C. Fear
Townsend
New Brighton,

● *It's Copper & Brass Research Ass ation, 420 Lexington Ave., New Y 17.—ED.*

how big a "buy" is BROACHING?



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comes up with a neat answer
in this amazingly smooth-operating

50 hp 120-inch stroke single ram horizontal BROACHING MACHINE
with **ELECTRO-MECHANICAL DRIVE**

LAPOINTE BROACHING
is truly a big "buy"
in these days which require the utmost in production speed, the maximum ability to meet tolerance and finish specifications, and the lowest possible production costs.

Full **CARBIDE-TIPPED TOOLING** and a broaching speed up to **160 feet per minute** result in a production of 125 clusters per hour (625 individual bearing caps) completely broached in the same stroke as follows:

1st station: broach back face and boss. 2nd station: finish broach joint faces, edges, and adjacent chamfers.

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Single ram horizontal, **SRHE- 3**

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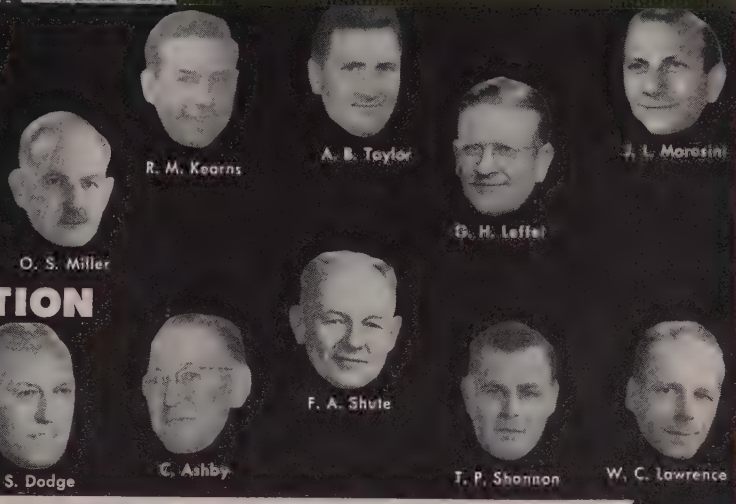
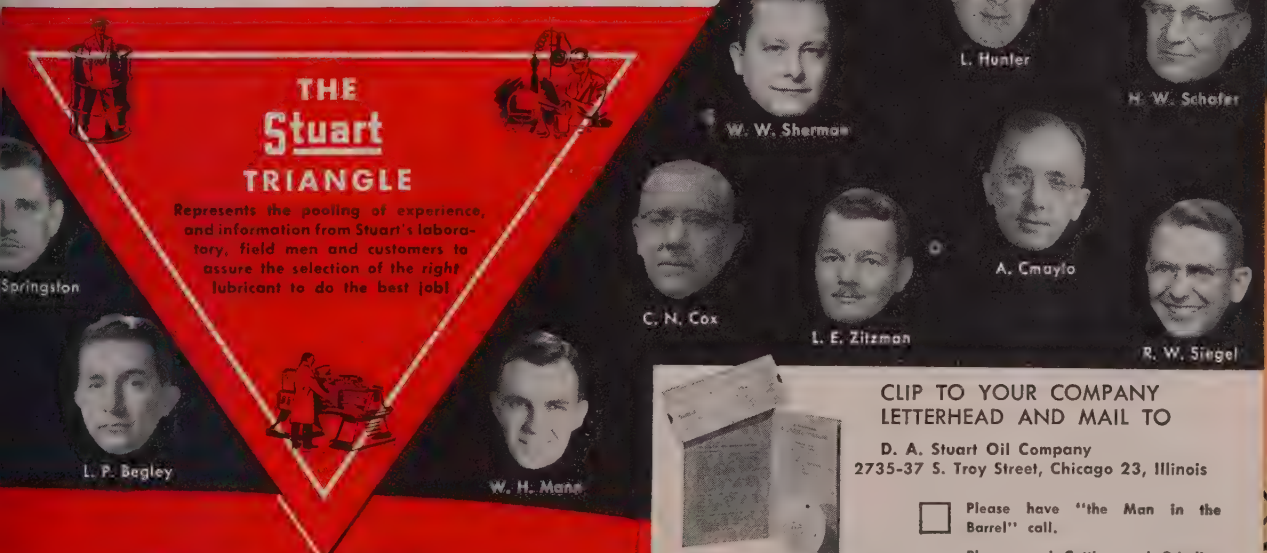


He's experienced, qualified . . . he knows how to solve industrial lubrication problems. Back of him is Stuart's research laboratory, one of the finest in the country exclusively devoted to industrial lubrication problems. Here, men are constantly at work developing new products and improving established ones so that Stuart customers are assured the best possible results . . . *greater production, improved surface finishes and longer tool life.*

Stuart products "The Man in the Barrel" sells include straight oil type cutting and grinding fluids, water-mix cutting and grinding fluids, drawing and stamping compounds and lubricating oils and greases for gears, bearings and machine tool ways. The next time you have an industrial lubrication problem, contact "The Man in the Barrel." With almost 90 years specialized company experience behind him, he's your best guide to the *right* oil for your job to *save you time, money and material.*



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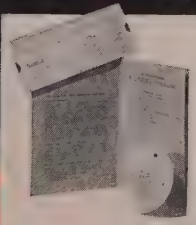
Represents the pooling of experience, and information from Stuart's laboratory, field men and customers to assure the selection of the *right* lubricant to do the best job!



A quick guide to starting recommendations for any job

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D. A. Stuart Oil Company
2735-37 S. Troy Street, Chicago 23, Illinois

☐ Please have "the Man in the Barrel" call.

☐ Please send Cutting and Grinding Fluid Selector and Dilut-O-Graph Folder.

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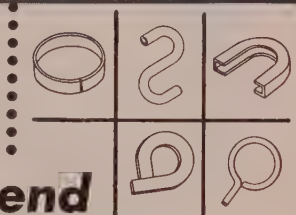

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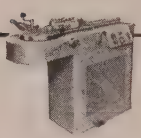
Simple and complex bends can be formed and duplicated in many ductile materials with a versatile Di-Acro Bender. Bending capacity of the five hand operated models ranges from 1/16" wire to 1" round mild steel bar. Many accessories are available for bending various materials and shapes. The Di-Acro Bender can be delivered completely tooled for most forming requirements in solid materials and tubing.

*Pronounced Die-ack-ro



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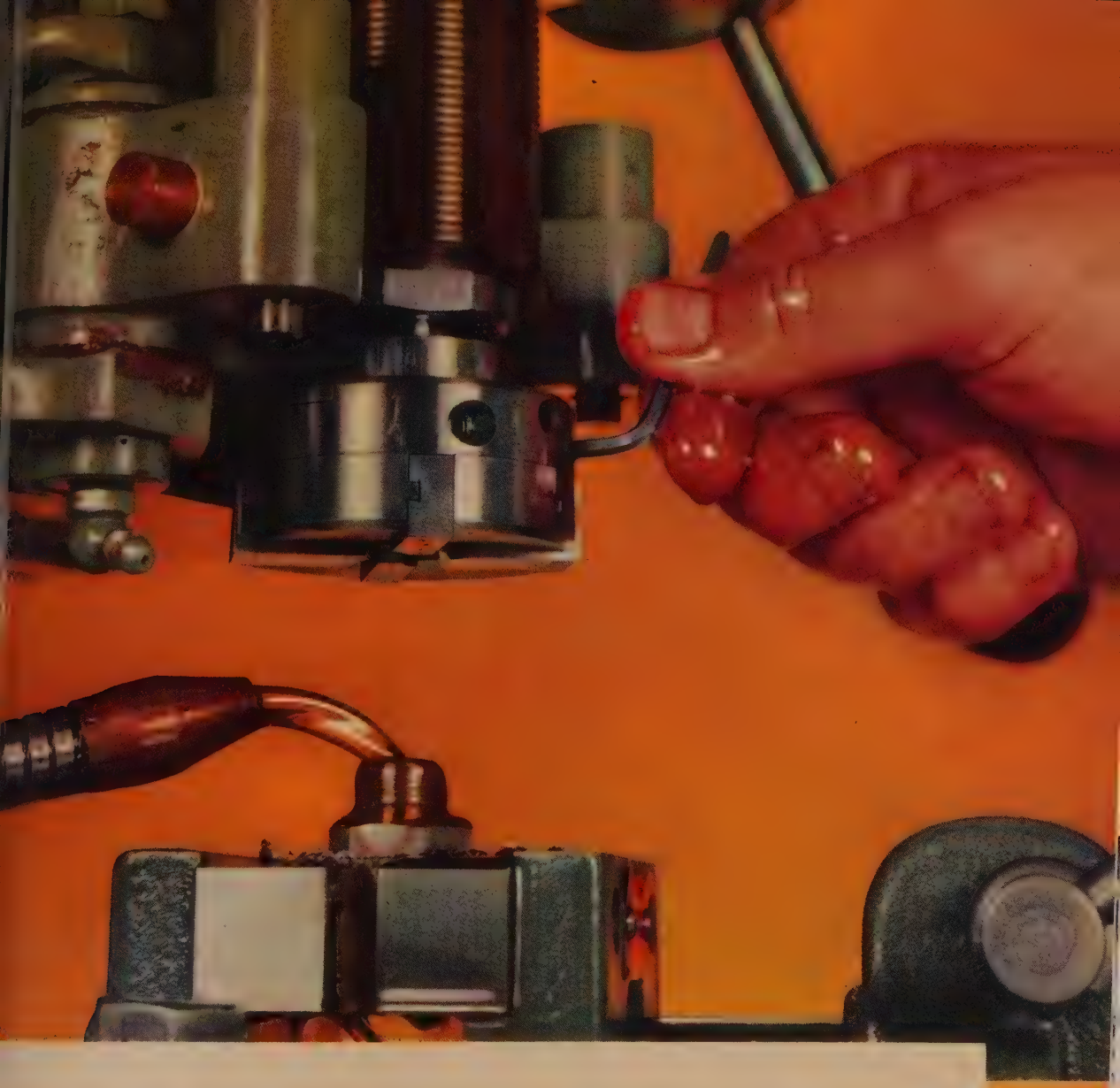

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yle DJ Solid Adjustable GEOMETRIC Die Head is compact and very short — designed to ing in limited tooling space. What's more, it has no face plate, so that regular chasers otrude enough to permit close-to-shoulder threading.

his handy die head permits quick adjustment to decimal sizes and various classes of reads. Chasers may be changed for different diameters and pitches too! The DJ head is eal for short-length threading where quick back-off eliminates need of a self-opening ad. Twelve sizes cover #0 to 6″ diameter range.

ite for full details. Specify Bulletin DJ

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GEOMETRIC TOOL COMPANY DIVISION

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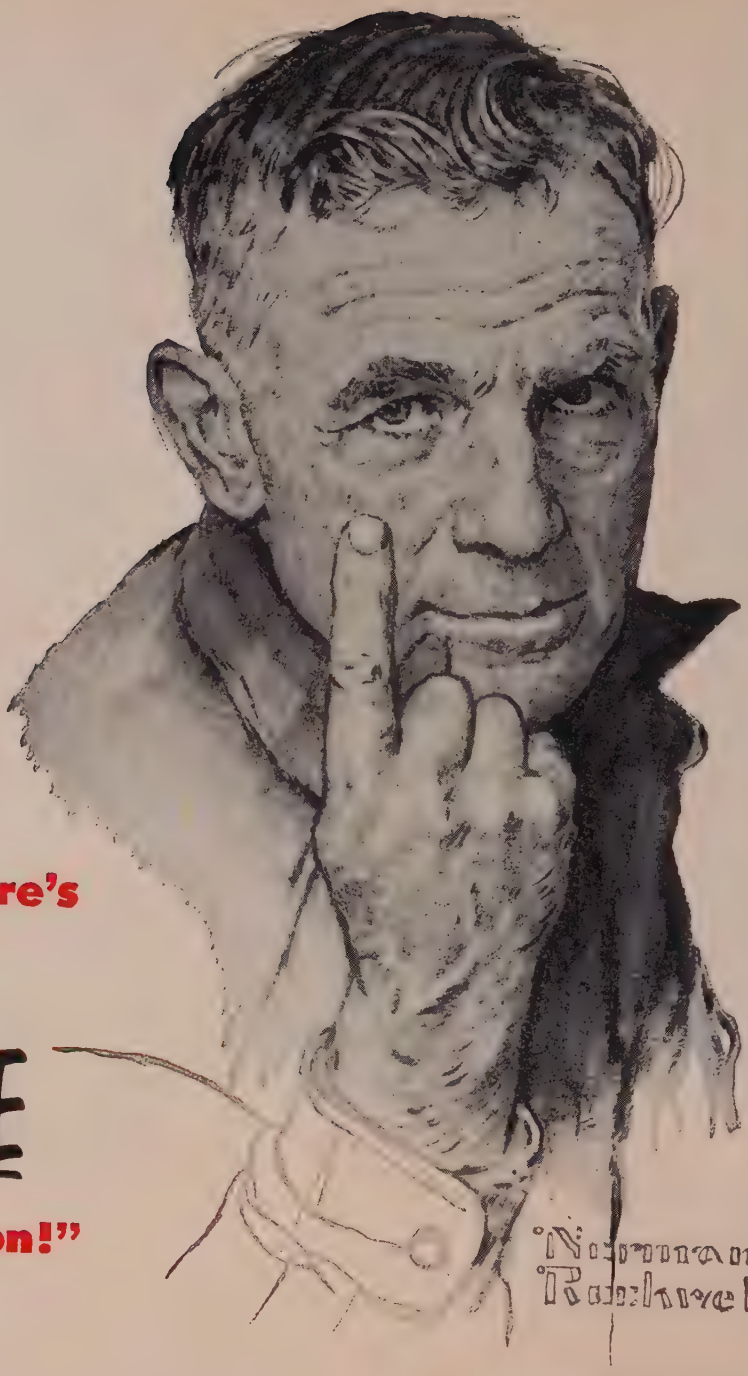
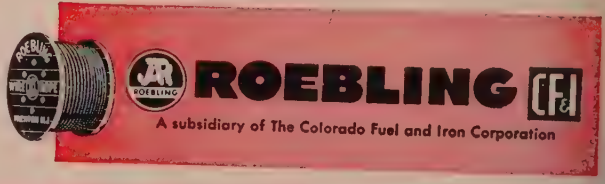


IT'S JUST THAT SIMPLE. There's only one reason in the world why so many wire rope users in the industrial field prefer Roebling wire rope . . . *it costs a lot less on the job than any other.*

For maximum wire rope efficiency and economy, call your nearest Roebling office for a Field Man. He'll recommend the best ropes for your operations.



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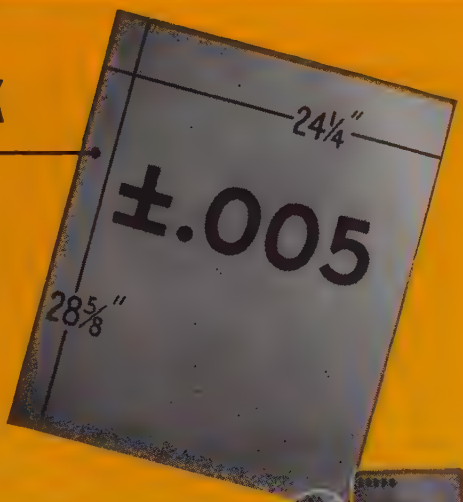
THIS accurate BLANK

saves money

ALL ALONG THE LINE



Photos Courtesy The F H Lawson Company

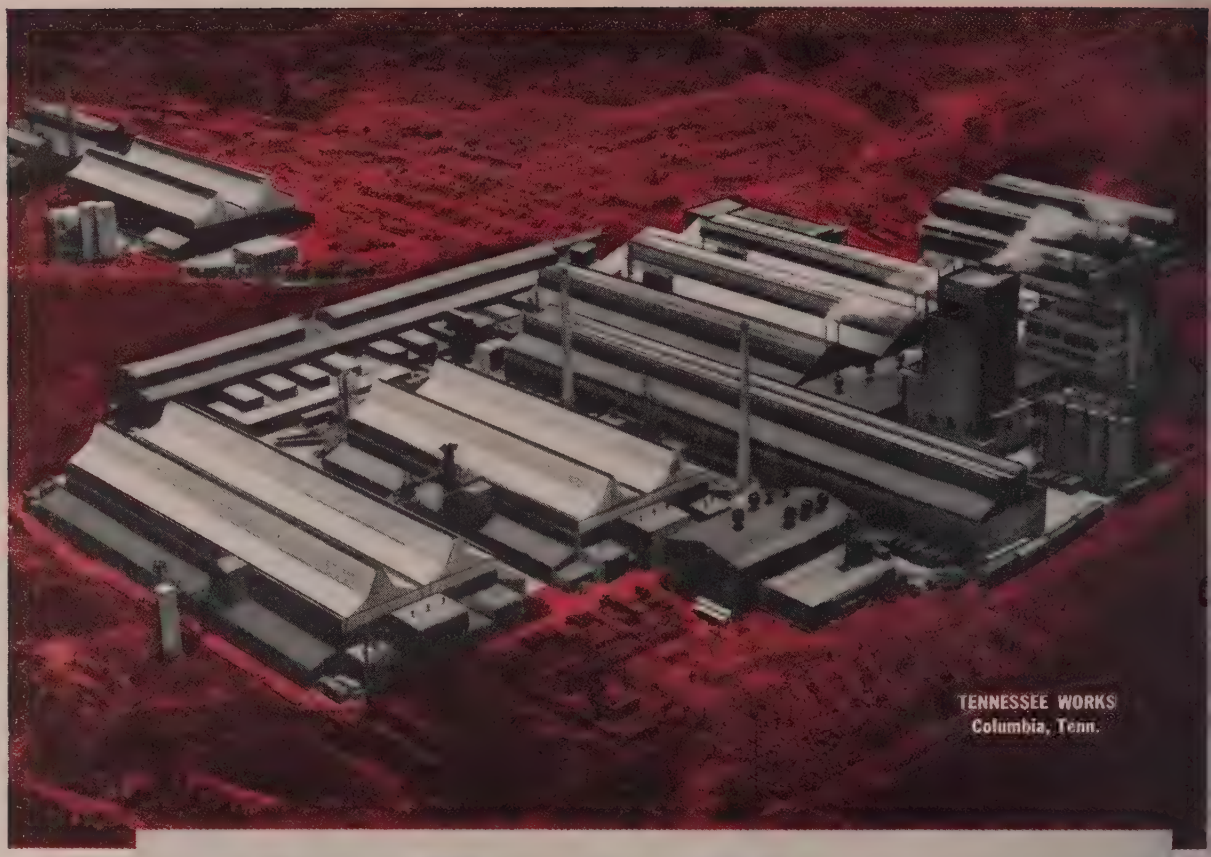
These accurate blanks are held to tolerances of ± .005" on Cincinnati Shears in the shops of The F. H. Lawson Company, manufacturers of medicine cabinets, pails and all sorts of containers.

In lots of 10,000 at 400 an hour these 24½" x 28⅝", 26 gauge blanks are produced with such accuracy that production costs all along the line are low. One and one-half to two million cuts are made before knives need regrinding . . . another important factor in the low cost. Rejects and reworks are very few. Only accurate blanks bring low cost forming and assembly.

Write for Catalog S-6.

THE CINCINNATI SHAPER CO.

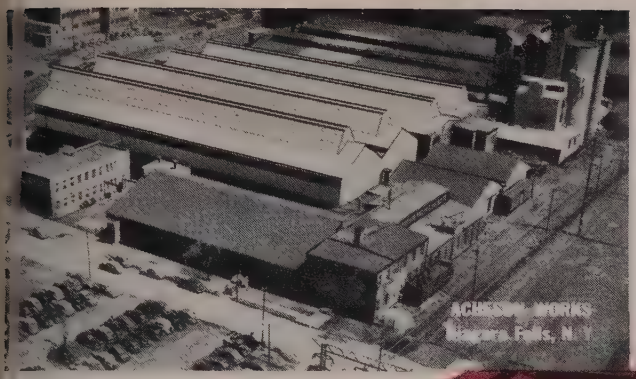
CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



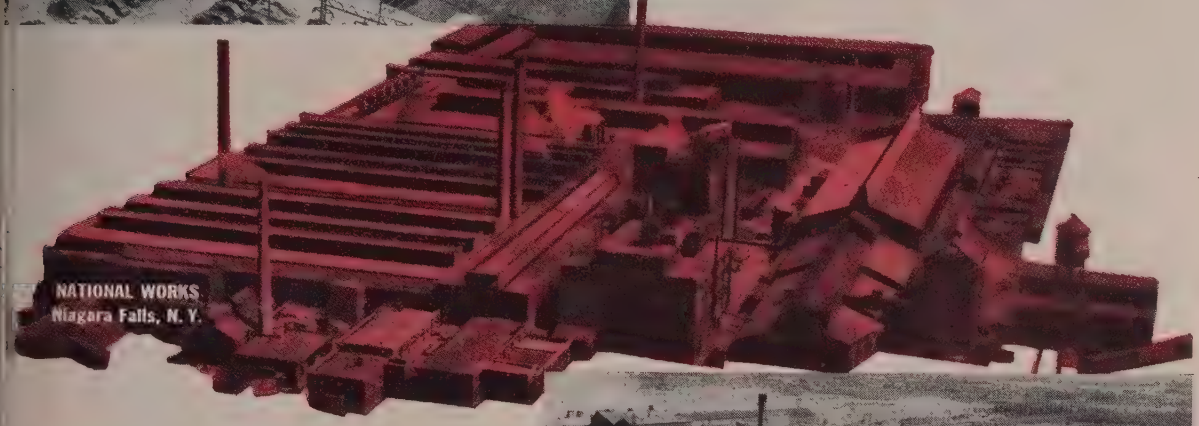
FIVE REASONS WHY NATIONAL CARBON COMPANY ELECTRIC FURNACE ELECTRODES GIVE YOU THE MOST FOR YOUR MONEY...

ELECTRODE QUALITY . . . has a direct bearing on the quality of *your* product; in many instances, it can materially affect your *cost*. National Carbon's graphite and carbon electrodes are, and always have been, the finest quality obtainable *anywhere*. We make this statement without reservation.

NEW PRODUCT DEVELOPMENT . . . is basic in technological progress. National Carbon has *always* done the major part of this country's electrode research and development . . . a share out of all proportion even to its outstanding leadership in the production and sale of these products. This is a matter of long-standing record.



PLANT CAPACITY . . . National Carbon's ability to *produce* is at an all-time high. The five plants shown here are fully integrated for production of both carbon *and* graphite electrode products — a situation rare in the industry and in keeping with National Carbon's far-sighted planning to pace requirements of a rapidly-expanding economy. For example, plant additions in the last five years alone have more than doubled graphite electrode capacity.



EXPERIENCE . . . of National Carbon is the foundation, building blocks and cornerstone of electrode-products manufacture in this country. First with commercial production of both carbon and graphite electrodes in the early 1900's, National Carbon introduced the first of each increasingly larger electrode size from that time to the present, plus a host of successful accessory items for improved application of electrodes in the metallurgical field. Today, National Carbon is the only company producing carbon electrodes up to 45″ diameter; graphite electrodes to 35″. Even larger electrodes and other massive shapes can be made with present facilities. Inquiries are invited.

RESPONSIBILITY . . . to customers and to the industry as a whole . . . expresses itself several ways in National Carbon history. The company has consistently kept ahead of demands for both quality and size of electrode products; National Carbon research stands virtually alone in the steady march of new product development; and, in the field of *service,* National Carbon is supreme. For many years we have conducted an expanding, electrode technical-service operation, staffed by a group of electrode experts, specially trained to help you get *more for your electrode dollar.*

The terms "National" and "Acheson" are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY

A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

District Sales Offices:
Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

In Canada:
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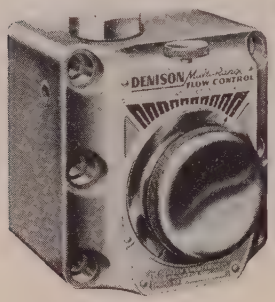
DENISON HydrOILics

. . . for longer-lasting efficiency

PUMPS, MOTORS and CONTROLS

"The Finest Money Can Buy!"

Denison Axial Piston Pumps.
Hydraulically balanced, high-pressure, high-volume pumps in a range of sizes for circuits of 3000 and 5000 psi capacity . . . volume capacities 3.5 to 35 gpm. Constant volume, or variable volume with control by hand wheel, pressure compensation, stem, or cylinder. Face, flange or foot mountings. Catalogs P-4-1, P-4-2, P-4-3, P-4-10.



Multi-Range Flow Controls
permit full-scale regulation of flow for many different circuit needs, at pressures to 3000 psi. Infinitely adjustable within each range of control . . . cartridge-type single-spool design adjusts easily to various pump deliveries without changing spools. 2-port and 3-port types, with or without built-in check. ¼", ⅜" and ¾" sizes; 0 to 28 gpm capacities.

Pilot-Operated 4-Way Valves
—with solenoid control—for circuit pressures to 5000 psi. Eliminate spool-sticking during long high-pressure holding cycles. System pressure shifts valve spool; solenoid operates valving only. Catalog VD-1-1.

For more than 25 years, Denison has been meeting Industry's toughest demands for oil-hydraulic equipment—with efficient high-pressure components that have won wide approval for their rugged, compact design and long, low-cost performance.

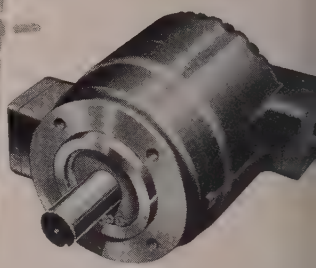
To meet constantly increasing needs, Denison now offers *today's most rapidly expanding line* of equipment for packaged hydraulic power, hydraulic transmissions, remotely controlled equipment, and other requirements for widely adjustable power, speed and control. A few of these HydrOILic components are shown here.

To make sure you get the fullest advantages of oil hydraulics—for variable-speed drives, accurate pressure control, spark-free power transmission, or closely controlled motion of any kind—specify Denison's HydrOILic Equipment.

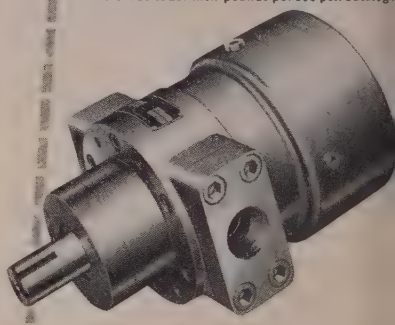
Write for further details or call your Denison representative today.

The DENISON Engineering Co.
1163 Dublin Rd., Columbus 16, Ohio

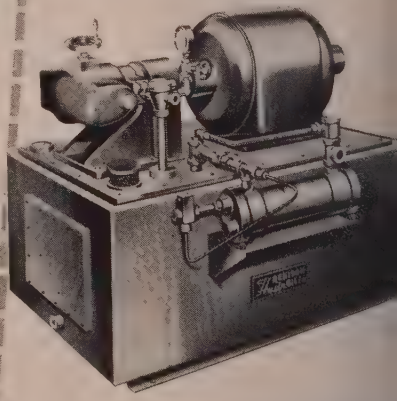
DENISON HydrOILics



Vane-Type Single-Stage Pump/Mot
built for continuous use at pressures to 2000 are ready for either pump or fluid motor d without alterations. Rotation of shaft can be eit direction without internal adjustment. Four siz p.us interchangeable cam rings, offer pump capacities from 2½ to 70 gpm, or torque rati from 13 to 257 inch-pounds per 100 psi. Catalog F



Denison Axial Piston Fluid Motors.
Four sizes, with torque capacities ranging from 5 to 5585 inch-pounds (about 24 to 160 HP). Speeds 2000 and 3000 rpm. Compactly built . . . largest size only about one foot in diameter. For circuits of 25 and 5000 psi. Catalogs FM-2 and FM-3.



Denison's Self-Contained Pumping Units.
37 models cover any circuit need from 400 to 5000 psi a from 2 to 35 gpm requirements. Automatic water-coo oil coolers or two-pass automatic heat exchangers av able for extra heavy or continuous service. All operat components mounted on reservoir top in sing panel assembly, for easy removal as a unit. Catal PU3 and PU4.

PEERLESS

ENGINEERING EXCELLENCE

that does the Never-Before

NOW

like this short Transfer with Overhead Return Conveyor— created to do a tough job in minimum floor area!

Part and Production: Intake Manifold for a new leading V-8 Engine. 180 pieces per hour at 100% efficiency.

Type of Specialized Production Equipment: 6-Station Automatic In-Line Transfer-Type Drilling-and-Tapping Machine with Automatic Overhead Pallet Return.

Tooling: Single-Place Pallet-Type Fixture with Manual Clamping. Anti-friction Drill and Individual Lead-Screw Tapping Heads.

BEFORE this PEERLESS, Plant Engineers were told that it was impossible to make a Transfer Machine which could be installed in such a small floor area.

NOW this PEERLESS, with specially-designed Overhead Pallet-Return Mechanism, is doing the job—setting a new high in maximum use of floor space!

Built to process all angular and bastard holes on Intake Manifolds, this PEERLESS was engineered for great flexibility—

Flexibility to take care of engineering changes if motor parts are altered.

Isn't this the kind of Engineering Excellence you want for your Specialized Production Equipment?

See other examples of PEERLESS Engineering Excellence that does the Never-Before, NOW!

WRITE FOR FREE 28-PAGE CATALOG

PEERLESS PRODUCTION CO.
19449 GLENDALE AVE. • DETROIT 23, MICH.

Gentlemen: Please send me your catalog.

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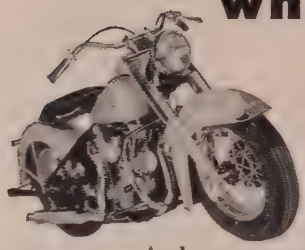
PEERLESS

ECIALIZED PRODUCTION EQUIPMENT

What happens to the transmission when horsepower goes up?



Harley-Davidson faced the problem when it increased horsepower from 30 to 55. In a motorcycle, it usually means a bigger transmission. More steel. Maybe more parts. And more expense.

Company engineers, with the help of Republic metallurgists, took a good look at alloy steels. They chose Republic's 8617 for a lot of reasons. One of them was the reduction of section possible. Another was the good heat-treating and carburizing properties. Still another, it stood up well under the heavy strain of gear teeth.

And, most important, the transmission could stay the same size and still take tremendous impact and stress.

Get an idea from this? Lots of manufacturers have. Like Harley-Davidson, they looked into Republic Alloy Stee Some of them cut costs. Others made better produc Others got a better competitive position. You can the same. A call to your nearest Republic Sales Offi is all it takes to get started.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

REPUBLIC ALLOY STEELS

CALENDAR
OF MEETINGS

une 20-23, Aviation Distributors & Manufacturers Association: Mid-year meeting, Stanley hotel, Estes Park, Colo. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: H. Donald Richards.

une 20-23, National Metal Trades Association: Western plant management conference, French Lick Springs hotel, French Lick, Ind. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: Charles L. Blatchford.

une 20-24, American Society of Mechanical Engineers: Semi-annual meeting, William Penn hotel, Pittsburgh. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

une 21-23, American Management Association: General management conference, Hotel Statler, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

une 21-25, American Institute of Electrical Engineers: Summer and Pacific general meeting, Hotel Biltmore, Los Angeles. Institute address: 33 W. 39th St., New York 18. Secretary: N. B. Hibshman.

une 23-25, National Industrial Conference Board: Smaller business conference, Commodore hotel, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

une 23-27, American Coal Sales Association: Annual meeting, Broadmore hotel, Colorado Springs, Colo. Association address: 1625 Eye St., NW, Washington. Secretary: A. F. Kempe.

une 27-29, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 32 Third Ave., Mineola, N. Y. Executive vice president: E. A. Schoefer.

une 28-30, The American Society of Heating & Ventilating Engineers: Semi-annual meeting, New Ocean House, Swampscott, Mass. Society address: 62 Worth St., New York 13. President: L. N. Hunter.

une 30, Steel Shipping Container Institute Inc.: Summer meeting, Drake hotel, Chicago. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

uly 12-15, American Electroplaters' Society: Annual convention, Hotel Statler, New York. Society address: 445 Broad St., Newark 2, N. J. Executive secretary: P. Peter Kovatis.

uly 13-15, Western Plant Maintenance Show & Conference: Pan Pacific Auditorium, Los Angeles. Information: Clapp & Poliak Inc., 759 Monadnock Bldg., San Francisco 5.

uly 22-23, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

ugust 2-4, National Tool & Die Manufacturers Association: Board of trustees and committee meeting, Grand hotel, Mackinac Island, Mich. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

ugust 8-12, American Society of Sanitary Engineering: Annual meeting, Muehlebach hotel, Kansas City, Mo. Society address: 4716 Ewing Ave. South, Minneapolis. Secretary: Walter A. Dunn.

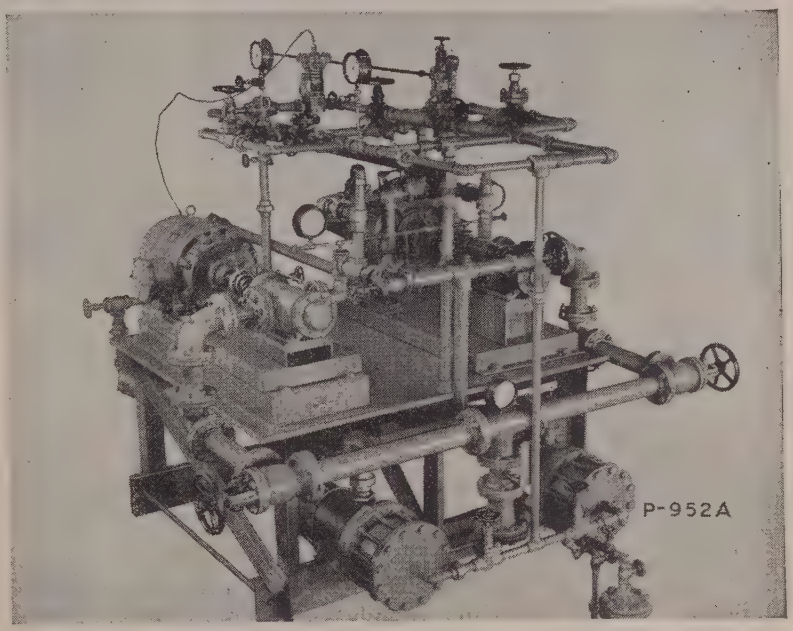
ugust 25-27, Western Electronic Show & Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Business manager: Mal Mobley Jr., 344 North La Brea Ave., Los Angeles 36.

ugust 30-September 3, Automotive Electric Association: Annual fall meeting, Vanss Springs hotel, Vanss Springs, Alberta, Canada. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

eptember 1-16, International Electrotechnical Commission: Golden jubilee meeting, University of Pennsylvania, Philadelphia. Information: D. E. Denton, Public Relations Dept., American Standards Association, 70 E. 45th St., New York 17.

Now!

MORE COMPACT THAN EVER . .



P-952A—Steam Turbine and Electric Motor drive gives flexibility in this compact Model P-ES2H size No. 25 unit.

NATIONAL AIROIL

FUEL OIL PUMPING AND HEATING UNITS

NATIONAL AIROIL Fuel Oil Pumping and Heating Units are specially designed to prepare, for combustion, all grades of fuel oil including No. 6 or Bunker "C" Oil and residuums. They will draw fuel oil from above ground or underground tanks, preheat it to proper constant temperature and deliver it to Oil Burners at an even pressure, best suited for the burners. Our Fuel Oil Pumping and Heating Units are the result of years of experience. They come completely equipped ready for steam, exhaust, condensate, oil suction, oil return, and electrical connections. All valves, regulators, etc., are readily accessible. The piping arrangement is easily understood. These compact, space-saving units are available in a range of sizes and models in both Medium and High Pressure types. For complete details, write for our Bulletin 40 — very interesting and informative.

- OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes
- STEAM ATOMIZING OIL BURNERS
- SLUDGE BURNERS, Steam Atomizing
- MOTOR-DRIVEN ROTARY OIL BURNERS
- MECHANICAL PRESSURE ATOMIZING OIL BURNERS
- DUAL STAGE, Combining Steam and Mechanical Atomization
- LOW AIR PRESSURE OIL BURNERS
- AUTOMATIC OIL BURNERS, for small process furnaces and heating plants
- GAS BURNERS
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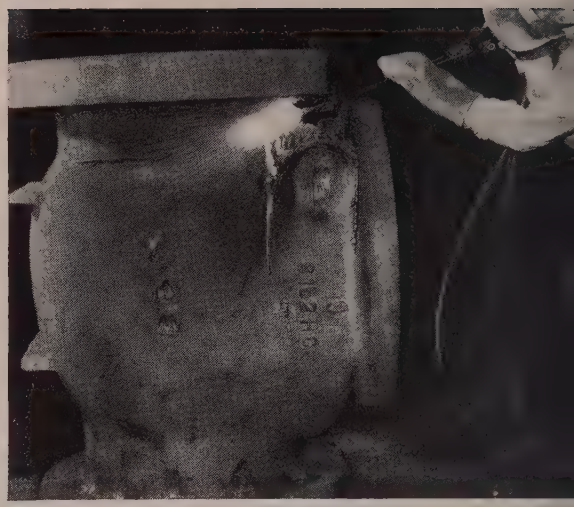
- FURNACE RELIEF DOORS
- AIR INTAKE DOORS
- OBSERVATION PORTS
- SPECIAL REFRACTORY SHAPES

NATIONAL AIROIL BURNER CO., INC.

1392 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.

Southwestern Division: 2512 South Boulevard, Houston 6, Texas

Powder-washing blowpipes have replaced swing grinders and chippers in removing defects and riser pads from railroad diesel trucks. Work is done faster and more efficiently—preheating is rarely necessary.



Powder-washing blowpipes remove riser pads in locations vi tually impossible for other methods. Risers between flanges o this valve body have already been washed away—note the smoot clean finish.

Why Powder-Washing is a Standard Tool in Modern Foundries

Powder-washing is the fastest, most efficient method for gouging and removing fins, pads, and stubs from casting surfaces and hard-to-reach places.

* Powder-washing is faster than grinding or chipping, and finished surfaces are clean and smooth.
* Powder-washing tools are quiet, easy to operate, and less fatiguing than chipping tools and grinders.
* In powder-washing, metal powder is added to the washing flame. This raises its temperature, and provides greater speed and control in cleaning sand and metal from castings. This process is effectively used to gouge or wash iron, steel, bronze, and some of the more complex oxidation resistant alloys.

Your local LINDE representative will be glad to give you detailed information on the powder-washing process, and help you determine the setup to best serve your foundry needs. Save time and money—call him today.

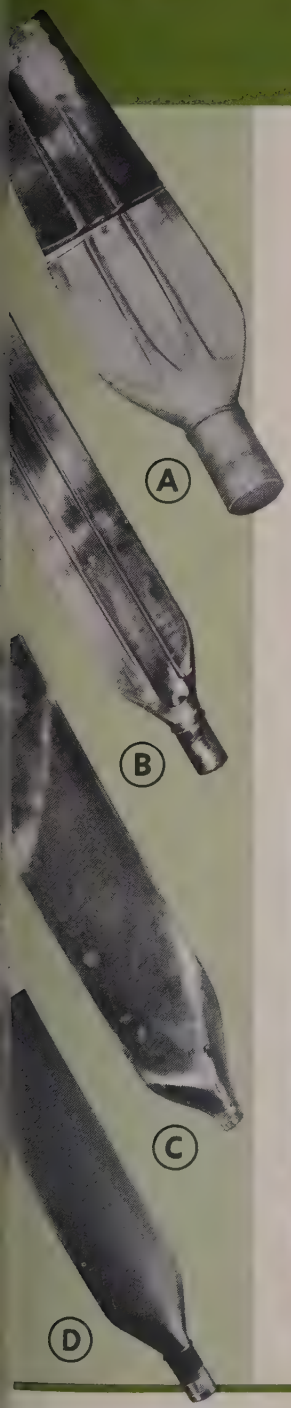
LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited, Toronto

Linde
TRADE-MARK

"Linde" is a registered trade-mark of Union Carbide and Carbon Corporat

New facts for your file on

USS CARILLOY STEELS



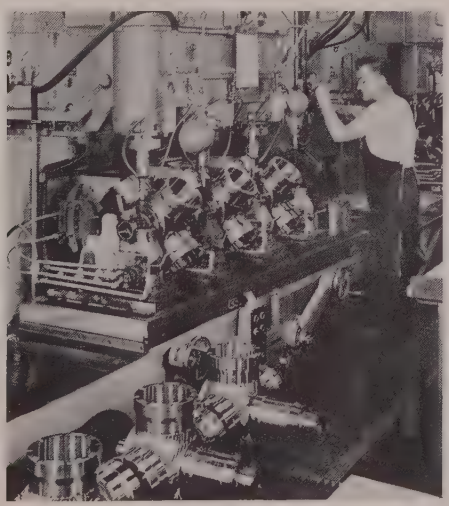
USS Carilloy steel passes rigid tests for propeller blades

● An important manufacturer of propellers for military aircraft has found that in stringent magnaflux tests, USS CARILLOY steel performs completely satisfactorily.

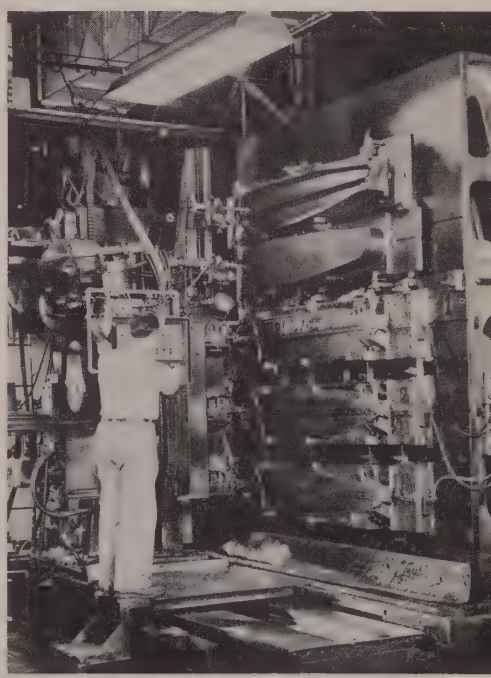
The high stresses in propeller blades and hubs naturally require extremely high quality steels. Accordingly, the U.S. Army and U.S. Navy have set up rigid quality specifications requiring that every heavily stressed part must be magnafluxed several times during its production.

With USS CARILLOY 4340 electric furnace aircraft quality steel, this important manufacturer is able to count on the performance required for this severe application. The consistent high quality of USS CARILLOY aircraft steel has meant greater savings to this customer through minimum magnaflux rejections of costly fabricated parts.

USS CARILLOY steels have established an enviable record for meeting the highest quality requirements. Therefore, when you need a standard AISI analysis or a special steel for an unusual application, it pays to call in a USS Service Metallurgist. He can help you solve any steel problem.



THESE HIGH QUALITY aircraft propeller hubs are forged and machined from semifinished CARILLOY 4340. They meet extremely tough magnaflux requirements.



AFTER FORGING AND MILLING, 750-lb. thrust sections are hogged out on this Kellering machine. Finished sections weigh about 155 lbs. USS CARILLOY steel maintains a No. 1 quality position on these heavy-duty parts.

FOR BIG PROPELLERS, 2 forged sections **(a)** are welded together to form one blade thrust member. Pieces are then ground and magnafluxed, Kellered, ground, and magnafluxed again **(b)**. Mill camber sheets **(c)** then are copper brazed to the thrust members. Entire unit is heat treated and polished before final magnaflux test and cadmium plating. Rigorous magnaflux testing assures that every finished blade **(d)** can withstand the tremendous stresses encountered on the latest high-speed planes.

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST

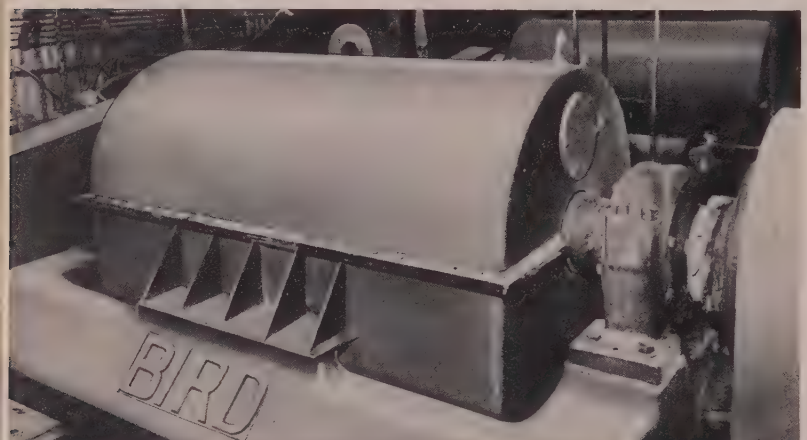
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

New facts for your file on

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

Solids removed from potash brine in centrifugals of Stainless Steel



THIS STAINLESS STEEL centrifugal filter at International Minerals and Chemical Corporation, Carlsbad, N. M., handles 10 tons of 60% muriate crystals per hour. It was manufactured by Bird Machine Company, South Walpole, Mass.

● Processing potash from the salt beds near Carlsbad, N. M., puts centrifugal filters to a severe test. That's why much of this equipment is made of Stainless Steel.

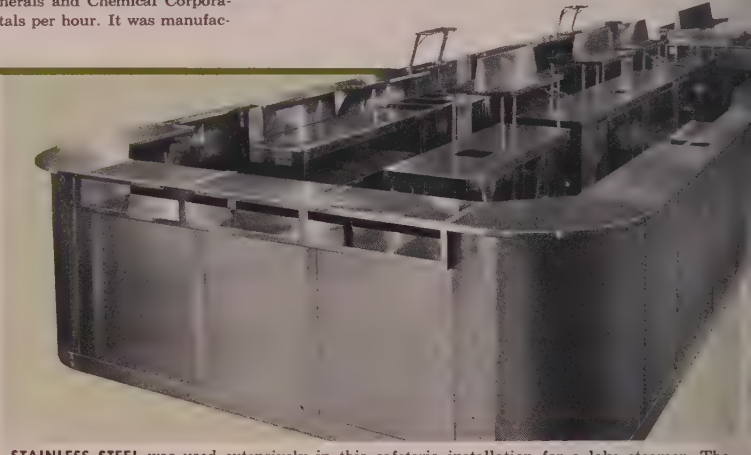
The potash brine is highly corrosive and the solids to be recovered are very abrasive. As a result, Bird Machine Company, South Walpole, Mass.—which supplies many of the centrifugals for this type of application—uses Stainless Steel for rotating parts and other parts of the filters that come in contact with the material.

Filters built of Stainless have handled many thousands of tons of these materials—separating and dewatering the crystalline solids—with high efficiency and overall economy.

Lake steamer cafeteria is fabricated from Stainless Steel

The attractive appearance, excellent sanitary qualities and long life of Stainless Steel have gained a wide range of food handling jobs for this durable material.

N. Wasserstrom and Sons, Incorporated, Columbus, Ohio, in fabricating cafeteria equipment for a Great Lakes steamer, used Stainless Steel very extensively. The result is an installation that looks well, cleans easily and lasts almost indefinitely.



STAINLESS STEEL was used extensively in this cafeteria installation for a lake steamer. The installation was fabricated by N. Wasserstrom and Sons, Incorporated, Columbus, Ohio.

MANUFACTURED FROM USS STAINLESS STEEL UNITED STATES STEEL

Now is the time to use the sales appeal of Stainless Steel

The many benefits of Stainless Steel make its use in your product a real "plus" from a sales standpoint. Its lasting good looks alone will often justify its use. And, along with this important advantage, goes exceptional resistance to corrosion and abrasion, ease of cleaning and low maintenance costs.

There's never been a better time to take advantage of the qualities of Stainless Steel. And when you do, be sure that perfected, service-tested USS Stainless Steel is used.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

New facts for your file on

USS HIGH STRENGTH STEELS

USS HIGH STRENGTH STEELS · UNITED STATES STEEL · 1953

VENTY YEARS OF PERFORMANCE

USS COR-TEN steel gives heavy-duty earth moving equipment the stamina to stay on the job

• By building maximum strength and durability into parts ordinarily prone to failure, Allis-Chalmers, through the use of USS COR-TEN steel, has ensured a high degree of productivity and profitable performance for their TW-300 Motor Wagon.

Used in the sides, ends and bottoms of the bowl of this big capacity hydraulically operated bottom dump wagon, COR-TEN steel increases strength 50% over carbon steel construction, provides 50% higher fatigue strength, materially increases resistance to abrasion and to sudden blows in loading. An added advantage is increased resistance to atmospheric corrosion—4 to 6 times that of carbon steel.

As a result, breakdowns and time-out for repairs are reduced to a minimum, as are maintenance and replacement costs.

n mass-produced truck body members, SS COR-TEN steel saves weight, adds strength, acilitates accurate construction

y mass-producing standardized truck dy shapes and sections that can be adily and quickly assembled, Parish essed Steel Company, Reading, Pa., s made it possible for local body ilders to turn out steel truck bodies meet individual truck owners' re-irements at high speeds and low cost. The use of USS COR-TEN high ength steel in these prefabricated body sections not only permits light, strong and very durable construction, but because of the high physical properties of this steel and its consistent uniformity, it is possible to hold designs to exact limits and very close tolerances. Over-all results are much better than when less efficient materials are used.

With USS COR-TEN steel construction like this, the body builder benefits because his operations are speeded up and his assembly costs are reduced. The truck owner benefits because he gets a truck that, while light in weight, has maximum strength and durability, is readily repaired if damaged and requires minimum maintenance.

New catalog gives complete story of USS COR-TEN steel

Here are 58 pages of factual data that show the substantial economies that can be affected in equipment and structures by using USS COR-TEN steel to reduce weight or to increase durability and service life. This book is just off the press. Crammed with information, it should be in the reference files of every designer. It fully describes the properties and characteristics of USS COR-TEN steel. Its many illustrations show the wide variety of applications in which this superior high-strength steel has been used to reduce operating costs and to keep maintenance costs at a minimum. Send for your copy.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Prior to reaching the storage operation—ore, sinter, pellets or limestone move from car dumper hoppers to Link-Belt rotary feeders. Then the material travels on Link-Belt belt conveyors to the 1900-ft. distributing belt conveyor shown here. This is equipped with a traveling tripper-stacker with 40-ft. boom that can be seen in the background stocking out iron ore. Materials can be individually stacked along its full 1712-ft. travel.

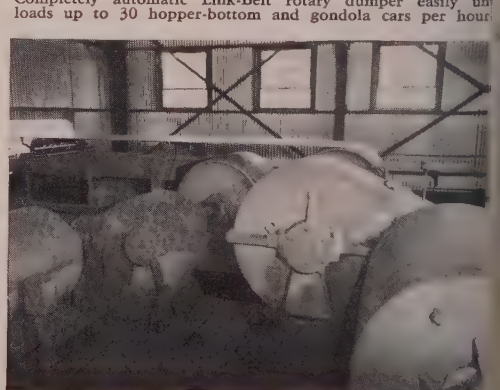
LINK-BELT accepts full responsibility for successful bulk handling operation

Read how LINK-BELT designed, built and erected unloading and storage facilities for large eastern mill

So satisfactory was the seven-year record of the Link-Belt coal handling system at this large steel mill, they again called on Link-Belt to modernize their other bulk handling. Now, from railroad car unloading to storage, Link-Belt has mechanized the movement of iron ore, sinter, pellets and limestone.

Link-Belt designed, built and erected the complete raw materials handling system for this mill—including such details as enclosures and electrical wiring. When you rely on Link-Belt as a single source, Link-Belt accepts full responsibility for placing your system in successful operation. Our engineers will also work with your own engineers, consultants and builders of mill and process equipment—help you get the best in modern handling of steel and raw materials in every form. For complete information, call the Link-Belt sales office near you.

Completely automatic Link-Belt rotary dumper easily unloads up to 30 hopper-bottom and gondola cars per hour



Dual motor drive to head of 1900-ft. long conveyor employs Link-Belt 200-hp and 150-hp parallel shaft gear drives.

LINK-BELT

MATERIALS HANDLING, PROCESSING AND POWER TRANSMISSION MACHINERY

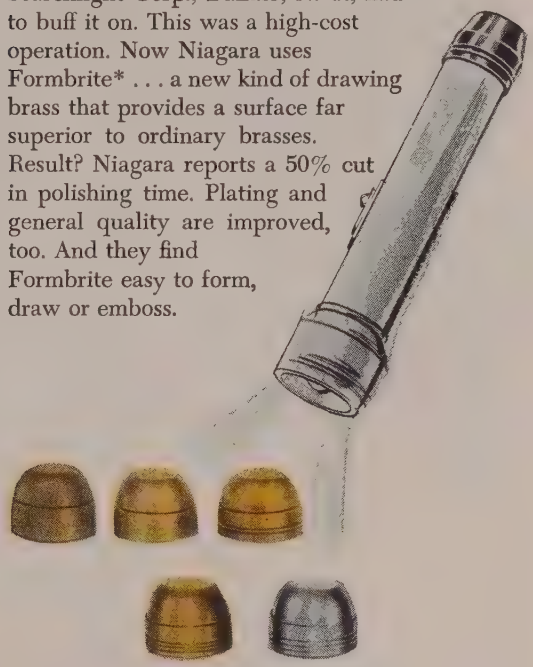
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,534

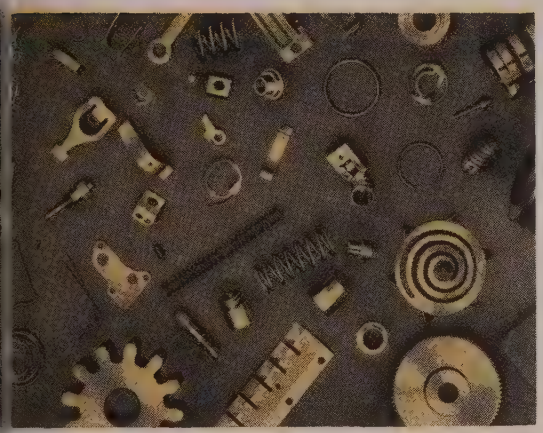
ANACONDA METALS AT WORK

The American Brass Company develops new kind of brass that cuts polishing time 50% for one manufacturer and improves product appearance for another...makes bronzes that extend the life of many metal parts

Spotlight on high luster at low cost

The high luster on these brass flashlight end caps didn't come naturally. Niagara Searchlight Corp., Buffalo, N. Y., had to buff it on. This was a high-cost operation. Now Niagara uses Formbrite* . . . a new kind of drawing brass that provides a surface far superior to ordinary brasses. Result? Niagara reports a 50% cut in polishing time. Plating and general quality are improved, too. And they find Formbrite easy to form, draw or emboss.





ld age insurance...

s easy to take out. And you pay no premium. l you do is specify ANACONDA Phosphor onze for the many components like those own. Ten alloys are available in seven forms. l are strong and tough. They bear up under nstant wear and flexings, periodic stresses, tigue and corrosion. They resist abrasion . . . nduct heat and electricity well . . . keep their gh elasticity. We'll be glad to help you select e Phosphor Bronze Alloy that's just right for ur job.

What's in a nameplate?

According to the Arlen Trophy Co., Brooklyn, N. Y., one of the largest trophy and premium manufacturers in the country, the *appearance* of a nameplate often means the difference between landing or losing a sale. But price is important, too. That's why Arlen now makes their nameplates out of Formbrite. It costs no more than ordinary brasses. Yet, because of its superfine grain structure, it polishes to a bright finish in half the time. Formbrite results in harder, stronger, springier, more scratch-resistant products, too.

5482

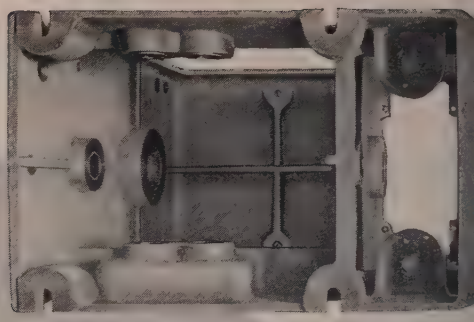
lant more information?

r Technical Department can give you a wealth of ormation on the properties and applications of rmbrite and Phosphor Bronze. Write to: *The American ass Company, Waterbury 20, Conn. In Canada: aconda American Brass Ltd., New Toronto, Ont.*

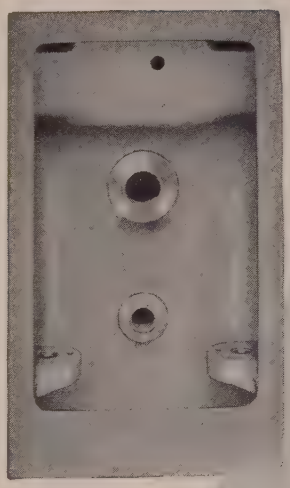
* U. S. Pat. Off.

ANACONDA®

the name to remember in COPPER • BRASS • BRONZE



BOTTOM



END

Figured from any angle...

SIDE

. . . this GRAY IRON casting does a better job for 50% less!

Production of a fabricated steel base for a press formerly cost the manufacturer approximately $302.00 for material and labor. By redesigning this base as a Gray Iron casting, the material and labor costs were reduced to approximately $150.00 . . . *a 50% saving!* Reduced machining time saved another 15%.

In addition to these substantial cash savings, the manufacturer also reports that this Gray Iron casting has proved to be a better all-around design than the fabricated steel base . . . both in appearance and in performance.

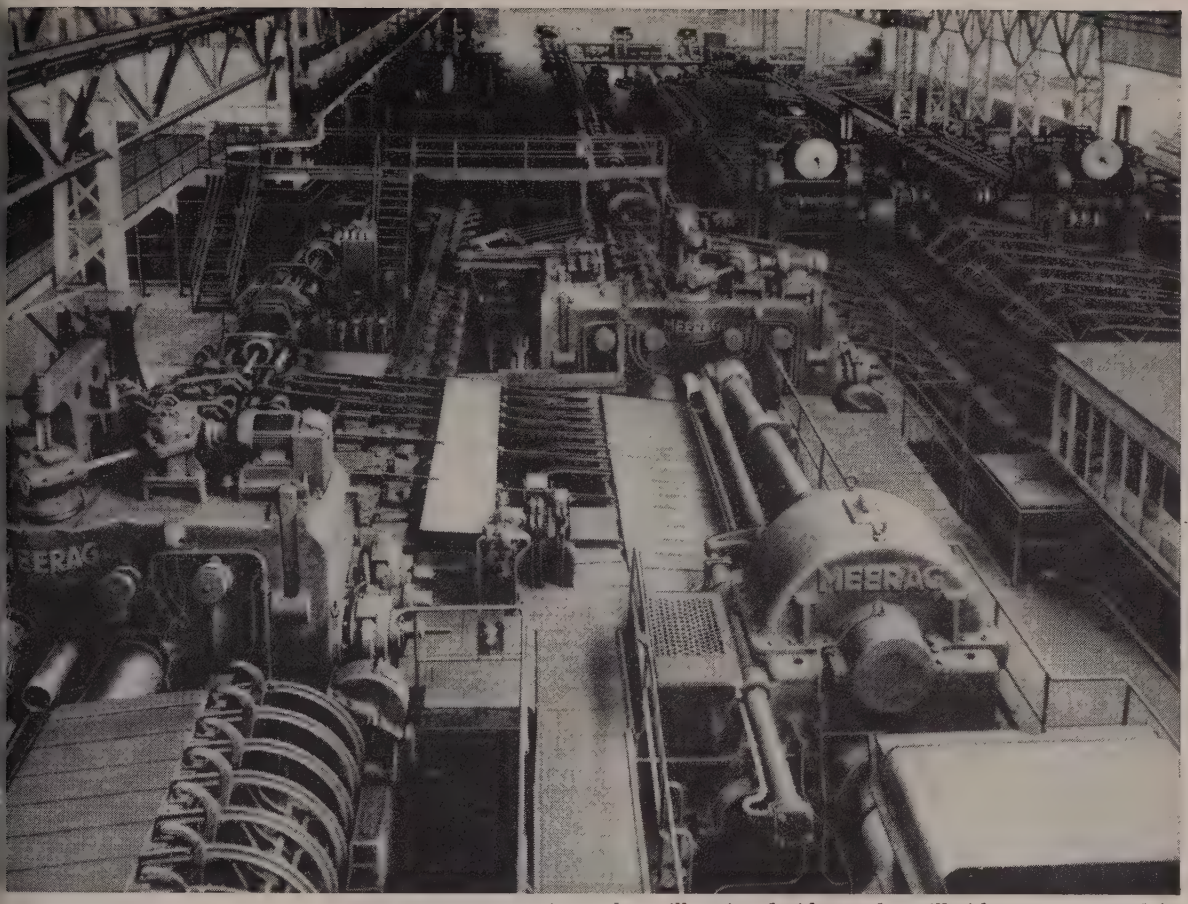
You, too, will find that it pays to use Gray Iron . . . from both engineering and economy angles. We will be glad to furnish you technical information on the many advantages of the Gray Iron casting process.

MAKE IT *BETTER* WITH GRAY IRON

75% of all cast metal products are Gray Iron

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG. CLEVELAND 14, OHIO



WORLD'S FIRST automatic seamless mill equipped with two plug mills (shown at upper right).

Seamless mill cuts costly down-time

• This well-known seamless tube mill had to find a way to make quick changeovers from one operating schedule to a radically different one. Mannesmann-Meer engineers solved the problem by installing two plug mills — the first time it had ever been done in an automatic seamless mill. The idea enabled the operators to cut costly down-time in half.

Here's a typical example of Mannesmann-Meer's ability to meet the growing need for extreme flexibility and versatility in tube mill operation. We're the only seamless mill manufacturer that can draw on years of experience in *mill operation.* This unique background makes Mannesmann-Meer best qualified to meet your seamless mill requirements.

Write us about pipe and tube mill equipment, mechanical and hydraulic extrusion presses for steel and non-ferrous tubing or special shapes, cold straightening machines, hydraulic equipment or other special machinery.

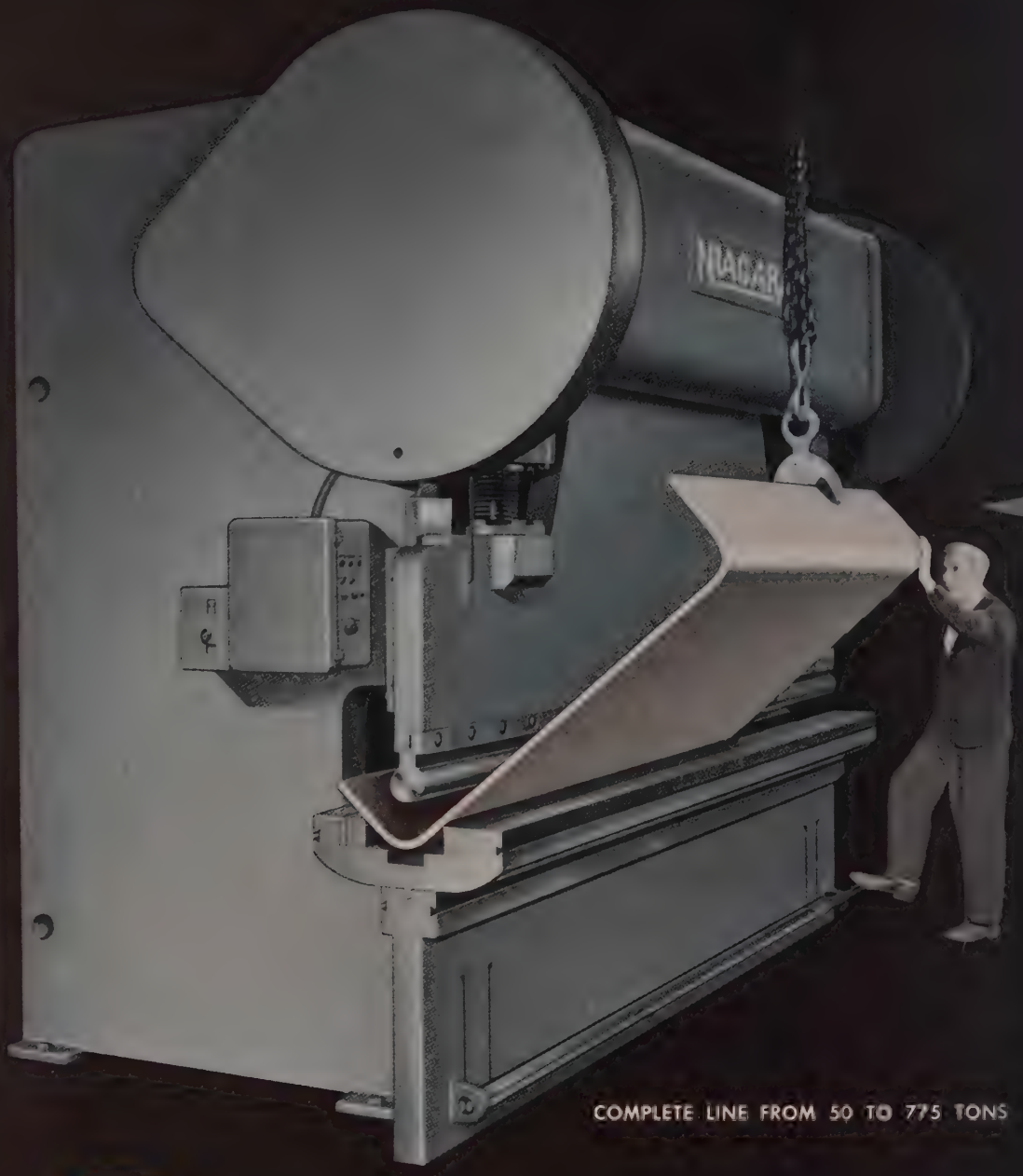
M.3.6

MANNESMANN-MEER
ENGINEERING & CONSTRUCTION COMPANY
900 Line Street, Easton, Penna.

WORLD SPECIALISTS IN HIGH-SPEED TUBE-MILL MACHINERY

IT'S THE NEW, "YEARS-AHEAD" LINE

Far out front on every point of comparison



COMPLETE LINE FROM 50 TO 775 TONS

NIAGARA MACHINE & TOOL WORKS 1874 75 1949

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Wor

NIAGARA

ALL STEEL PRESS BRAKES

"MULTI-MACHINE" VERSATILITY TO BOOST PRODUCTION

Practically limitless in their scope of forming, bending, punching, blanking and related operations, Niagara Press Brakes get more done for you because they do more jobs. One reason: Advanced design. Another: The extensive line of Niagara Press Brake Dies available.

UNIFORM BENDS WITH STRAIGHT-EDGE ACCURACY

Double end twin drives with double reduction gearing, *on all models,* provide uniform, constant application of power at both ends of the ram. Off-center loading presents no problem.

Rugged, streamlined frames feature box type crowns of unequaled strength and rigidity, assuring maximum resistance to deflection and permanent alignment of bearings and ram.

3-SHIFT STAMINA TO HANDLE WORK-HEAVY SCHEDULES

Close attention has been given to every design detail. Nothing has been overlooked. Each frame size has been scientifically tested to detect and eliminate harmful stresses at all critical points.

Laminated non-metallic ways, an exclusive Niagara feature, reduce wear to an absolute minimum, providing accurate alignment and longest possible service life. All gearing is totally enclosed in sealed oil baths for thorough, clean lubrication.

Once again, Niagara's forward-thinking engineering has produced a metal working machine years ahead of its time. As you become familiar with the significant developments embodied in this revolutionary new line of all steel press brakes, you will realize why it carries the Niagara nameplate. After all, who is more uniquely qualified to be its builder than the builder of America's most famed and most complete line of presses, shears, other machines and tools for plate and sheet metal work?

Call in your nearest Niagara representative at once. Let him tell you, *in detail,* what these great, new press brakes can do for you.

CHECK ALL THE FACTS, YOURSELF!

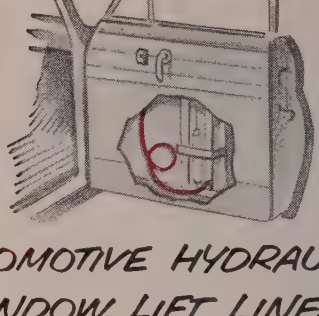
Compare. Make a careful, feature-by-feature appraisal of Niagara's years-ahead press brake design. Write for new Bulletin 89C . . . the most comprehensive press brake literature ever published.

NIAGARA MACHINE & TOOL WORKS
BUFFALO 11, N. Y.
DISTRICT OFFICES:
Detroit • Cleveland • New York • Philadelphia
Dealers in principal U. S. cities and major foreign countries

engineered to expand your output

...AT SAVINGS!

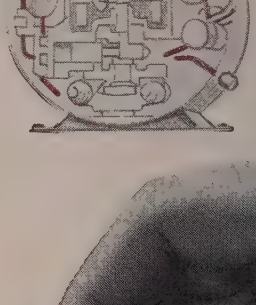
FROM *the Bundy Sketchbook*
TO *jog a designer's imagination*



AUTOMOTIVE HYDRAULIC WINDOW LIFT LINES

FRAME FOR OCCASIONAL TABLE

REFRIGERATOR COMPRESSOR LINES



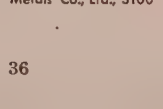
REMARKS Do you have a tubing design that won't jell -- or a fabrication kink you can't untangle? Whatever your tubing headache, why not turn it over to our engineering experts. They offer you years of problem-solving experience, plus the added bonus of Bundyweld, the only tubing double-walled from a single strip (see below).

WRITE today for catalog or for help in developing your tubing ideas.

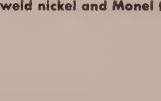
BUNDY TUBING COMPANY
DETROIT 14, MICHIGAN

SUPERMARKET PUSHCART FRAME

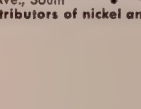
WHY BUNDYWELD IS BETTER TUBING



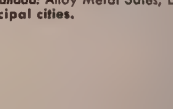
Bundyweld starts as a single strip of copper-coated steel. Then it's . . .



continuously rolled twice around laterally into a tube of uniform thickness,



and passed through a furnace. Copper coating fuses with steel. Result . .



Bundyweld, do walled and br through 360° c contact.

BUNDYWELD TUBING®

DOUBLE-WALLED FROM A SINGLE STRIP

Leakproof
High thermal conductivity
High bursting point
High endurance limit
Extra-strong
Shock-resistant
Ductile

Lightweight
Machines easily
Takes plastic co
Takes plating
Bright and clear
No inside bead
Uniform I.D., O.

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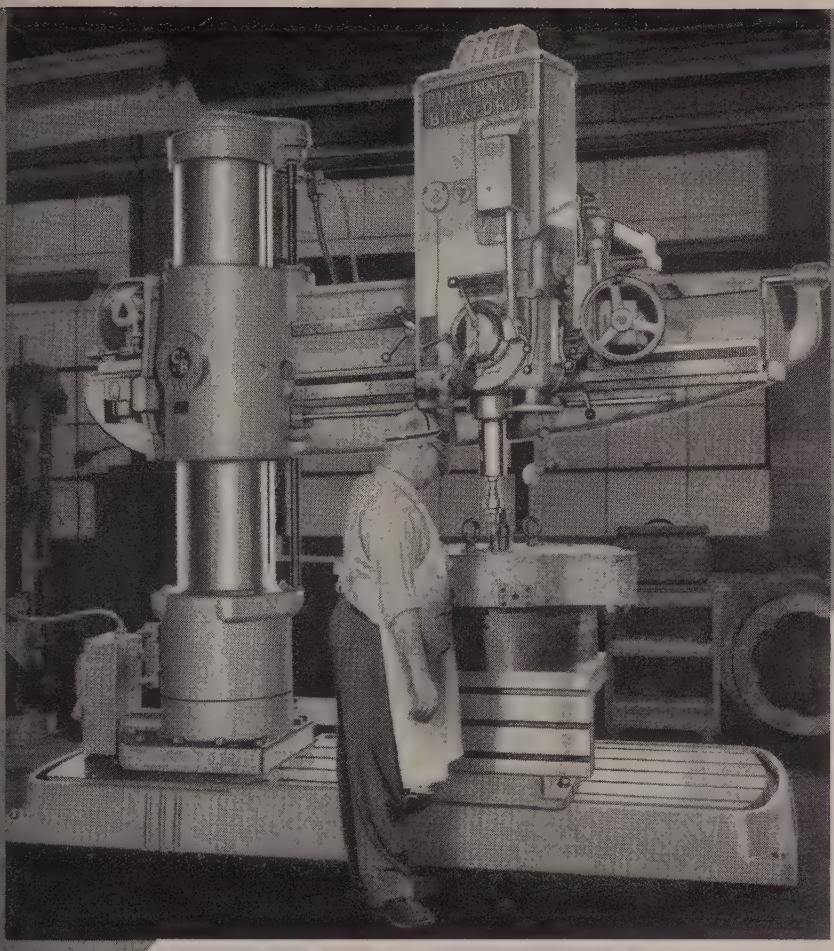
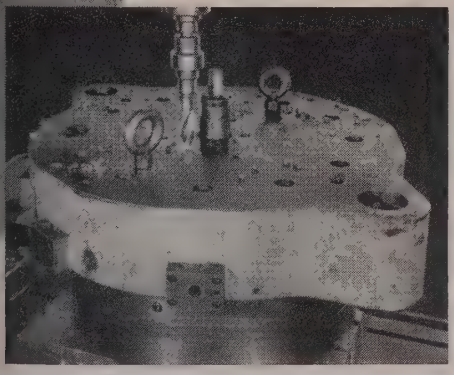
Bundyweld nickel and Monel tubing are sold by distributors of nickel and nickel alloys in principal cities.



6-foot arm, 17-inch column Super Service Radial Drill at Kelsey-Hayes Wheel Company, Detroit, Michigan.

Photos courtesy of Kelsey-Hayes Wheel Co. Detroit, Michigan.



A typical tool-room job, involving a wide range of speeds and feeds, and extreme accuracy.

"excellent

IN OUR TOOL ROOM"

The tools, dies and fixtures for the mass production of Kelsey-Hayes wheels, brake-drums and other automotive parts can only be produced on accurate machines. Since 1930 Cincinnati Bickford radial and upright drills have been used here. The machine shown above, recently installed, is rated "excellent" by this user, because of its many features for accuracy, ease of operation, safety, and productive capacity. Investigate these advantages of Super Service Radials—Write for Booklet R-29.

80 YEARS OF SERVICE

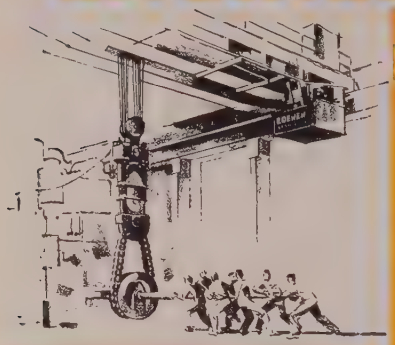
CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

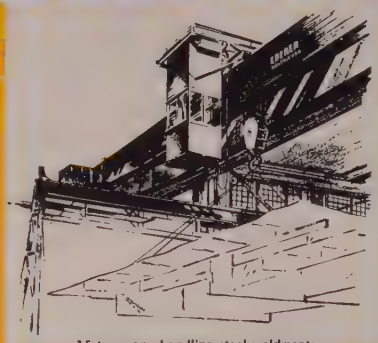
THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

ENGINEERED TO THE JOB



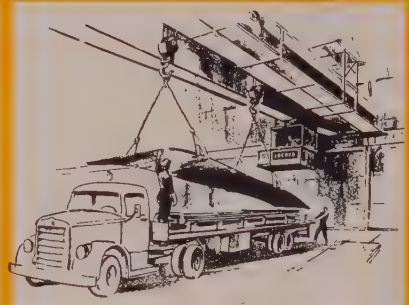
50-ton forge shop crane serves steam press



15-ton crane handling steel weldments

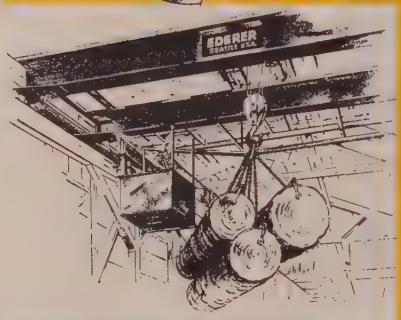
17-ton paper mill roll-handling crane

3-ton paper roll-handling grapple crane

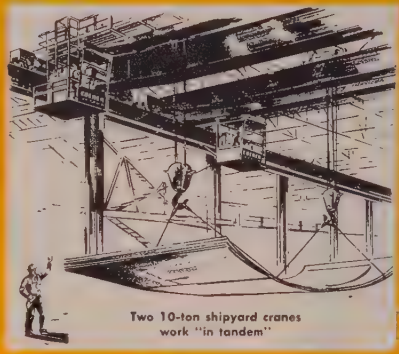


5-ton two-trolley steel warehouse crane

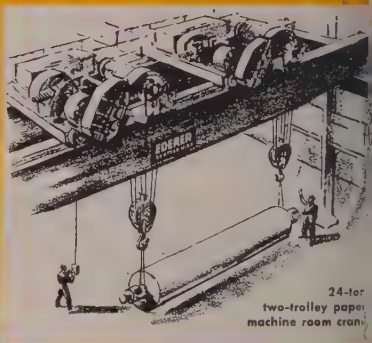
5-ton steel warehouse rod-handling crane



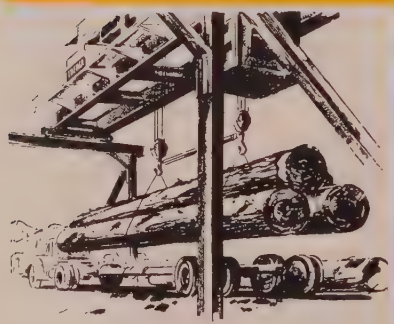
10-ton plywood mill log-handling crane



Two 10-ton shipyard cranes work "in tandem"

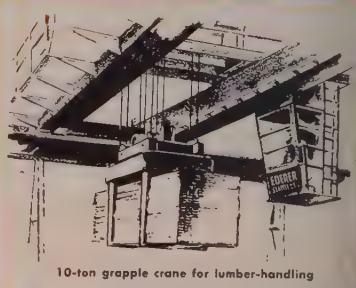


24-ton two-trolley paper machine room crane



20-ton fixed hoist log-unloading crane

50-ton steel mill crane; 10-ton auxiliary hoist



10-ton grapple crane for lumber-handling

If you'd like to know more about EDERER "job-engineering" of cranes — why not send for the new EDERER crane catalog — Bulletin CR-610?

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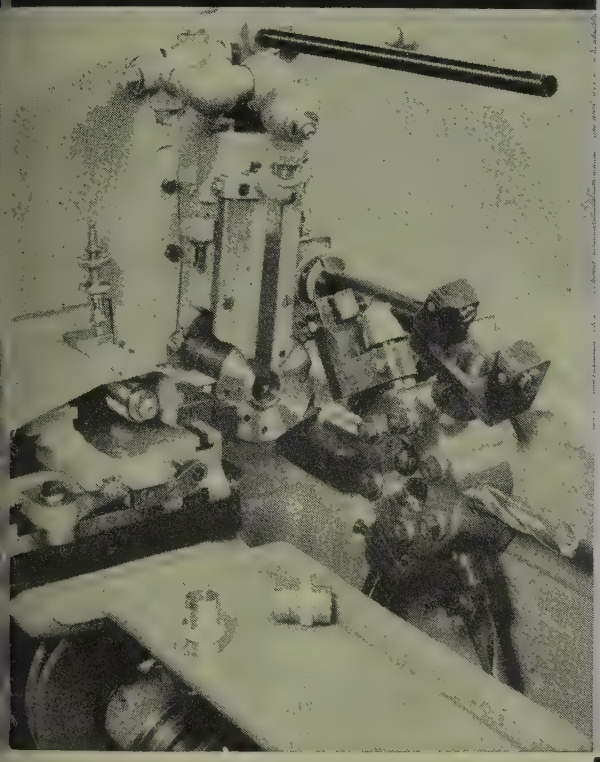
OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

EDERER CRANES

Up Goes Output...



Down Go Costs

when you use

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Aluminum alloys are excellent for screw machine work because, job for job, they machine at greater speeds and feeds—with standard tools, or with slight modifications for the higher speeds. That means a *step up* in production, and it's easy to see how your unit costs for material, handling and shipping *step down* with strong, lightweight aluminum that gives you three times the number of pieces per pound. Rust-free aluminum often requires no finishing but, when needed, takes most of the regular metal finishes . . . also permits a wide choice of attractive anodized finishes in natural tones and sparkling colors.

For prompt delivery on aluminum screw machine stock plus design and fabrication engineering service when you need it, call your nearby Reynolds Office or distributor listed under "Aluminum" in your classified telephone directory. They'll also show you how you can increase your sales and save your customers money if you submit alternate quotations based on aluminum when other materials are specified. For more complete information write on business letterhead for your free copy of the 124 page handbook, "Machining Aluminum Alloys," and index of Reynolds Literature. Reynolds Metals Company, 2520 South Third Street, Louisville 1, Kentucky.

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11S-T3—Free machining. Fine finishes at high speed. Free cutting, fine chips, good strength. Excellent for screw machine work. Longer tool life but slightly less strength than 17S-T4. Good formability of machined parts.

17S-T4—Excellent finishes. Fine for general purpose machining. Good corrosion resistance and strength.

SPECIAL MACHINING ALLOYS

24S-T4—For simple machine work. Chips long and curled. Stronger than preceding alloys. Smooth finishes.

61S-T6—Good corrosion resistance, weldability, strength. Lower machinability. Best formability and suited to electro-chemical finishes.

2S and 52S—Higher purity aluminum alloys available for special applications. Have good formability.

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NEW YORK
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Edgcomb Steel Corporation, Hillside, N. J.
Mapes & Sprowl Steel Co., Union, N. J.
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NORTH CAROLINA
Southern States Iron Roofing Co., Raleigh
OHIO
The Atlas Metal Co., (Ingot only) Cleveland
The G. A. Avril Company, (Ingot only) Cincinnati
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Extra Equipment That Lowers Costs

- **No capital tie-up in equipment**
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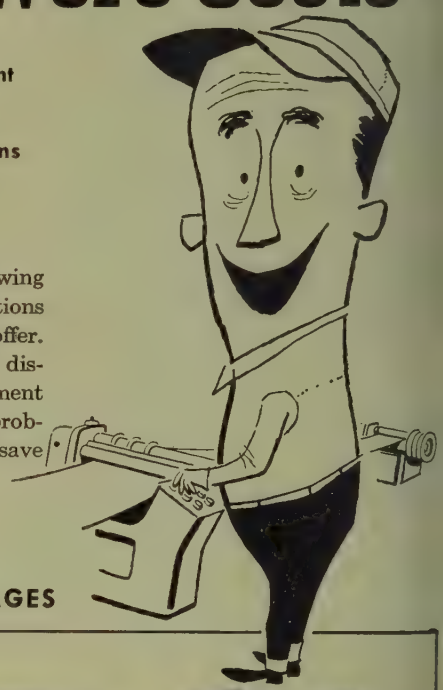
- **Save shop time and labor**

Slitting, cutting, shearing, sawing and other specialized operations are money-saving services we offer.

Let us show you how our distributor services and equipment can eliminate some of your problems, and, at the same time, save you money.



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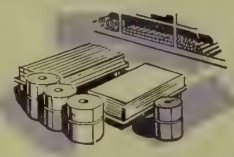
PROMPT SERVICE AND DELIVERY

You get fast delivery on both your "rush" orders and regular shipments. This helps you keep production on schedule . . . eliminates costly delays waiting for mill shipments.

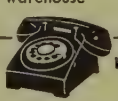


CONVENIENT WAREHOUSE STOCKS

We can help you eliminate capital tie-up in obsolete or idle inventory . . . this means that you can cut your stock record keeping, accounting cost and warehouse overhead.

YOUR PARTNER IN PRODUCTION

Whenever we can, we will help on your production problems. Reynolds technical service men in the field and the fully integrated staff at Reynolds home office work hand in hand with us.

Call us today for Reynolds Distributor Service.  *We're as near as your phone.*

REYNOLDS ALUMINUM

MODERN DESIGN HAS ALUMINUM IN MIND

Atlantic Steel's 75-ton baby *breaks records for 2nd birthday*

On May 13th Atlantic Steel Company in Atlanta celebrated the 2nd birthday of their 75-ton Lectromelt* Furnace. Look at how they have increased its production with experience . . .

RECORD HEATS . . . . Feb. 15, 1953—84 tons for 41 ingots
Feb. 8, 1954—88.15 tons for 43 ingots

DAILY RECORD . . . . March 7, 1953—460.3 tons
Nov. 5, 1953—473 tons

WEEKLY RECORD . . April 19-25, 1953—16 tons/hour for 35 heats averaging 76.7 tons/heat and totaling 2,684 tons

Nov. 1-7, 1953—16½ tons/hour for 39 heats averaging 77.7 tons/heat and totaling 3,031 tons

MONTHLY RECORD . . March 1953—10,890 tons
March 1954—11,894 tons

According to Atlantic they are constantly obtaining more consistent, higher quality, and are planning to let the Lectromelt carry their major production load, firing up their open hearths only as required.

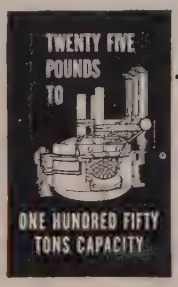
Write for Bulletin #9 describing Lectromelt melting furnaces and components. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . GERMANY: Friedrich Kocks GMBH, Dusseldorf . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

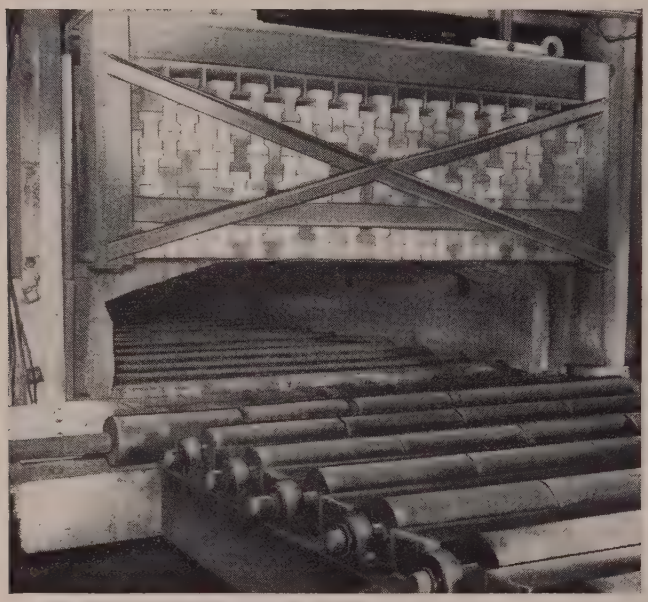
MOORE RAPID

WHEN YOU MELT... *Lectromelt*



Lower Maintenance Costs with HAYNES Alloys

Trade-Mark



3800 Hours at 2150 deg. F. —HASTELLOY *Alloy X rollers have been conveying metal sheet through this annealing furnace for 3800 hours. The rollers are subjected to thermal and mechanical shock, 2150 deg. F. temperatures, and exposed to an oxidizing and corrosive atmosphere. They are still in good condition.*

HAYNES Alloys operate efficiently where ordinary metals quickly wear away, corrode, or disintegrate under high-temperatures. They can help you keep production moving and cut maintenance costs.

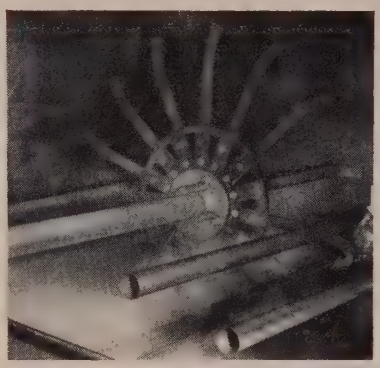
HAYNES Hard-Facing Alloys protect hot shear blades, dies, draw rings, punches, shafts, and other steel mill equipment from the effects of abrasion, heat, and impact.

HASTELLOY Alloys have high strength and remarkable resistance to severe corrosives and thermal shock. Use them to increase the service life of your pickling equipment.

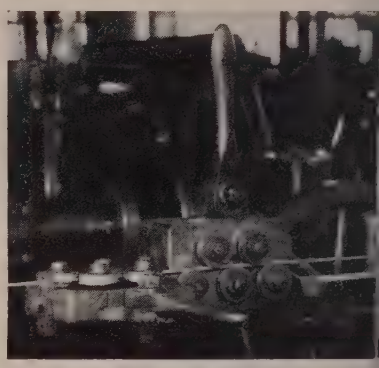
HAYNES High-Temperature Alloys are strong at temperatures up to 1800 deg. F., have high stress to rupture properties, excellent resistance to oxidation, and low creep rate. They give outstanding service in heat-treating furnaces.

For full information on forms, prices, and properties, contact the sales office nearest you.

Guide 200 Tons of Steel —*Entry guides hard-faced with* HAYNES STELLITE *Alloy No. 6 have lasted 4 to 5 times longer than unprotected ones in guiding hot bars. The guides are exposed to abrasion and heat.*



16 to 1 Life in Hot H_2SO_4—HASTELLOY *Alloy paddles show no loss in cross-section after carrying tubing in and out of a pickling tank for 4 years. Other materials had to be replaced after only 3 months' service.*



10 Years Service—*Wire-straightenin rolls cast from* HAYNES STELLITE *Alloy a still in good shape after 10 years' servic Steel rolls, previously used on this job, wo out every three or four months.*

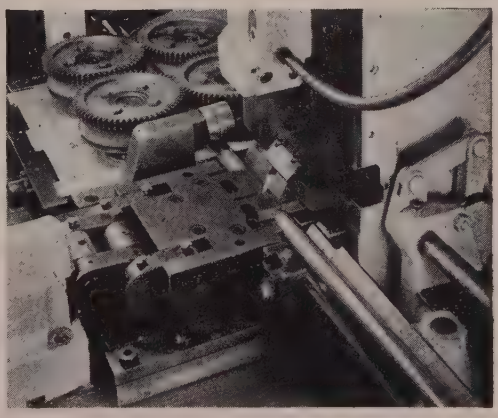
HAYNES
TRADE-MARK
Alloys

"Haynes," "Haynes Stellite," and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

NO DISTORTION . . . MINIMUM BURR . . .
ACCURACY WITHIN .002" . . .
CUTS ANY SHAPE . . .

Cut steel tubing at the amazing speed of 6000 cuts per hour. The Grieder Tube Cut-Off Machine features a heavy duty air operated combination clutch and brake unit that allows continuous operation at this terrific rate of production. Fully automatic . . . Rate of feed: 600 feet per minute . . . True cutting. Get full information, multiply your tubing production, reduce costs, write *today*.



GRIEDER INDUSTRIES, INC.
BOWLING GREEN, OHIO
SALES OFFICE: 309 RICHARDSON BLDG., TOLEDO 4, OHIO

DUAL METAL

What is "dual metal"? *Depends on what business you're in!*

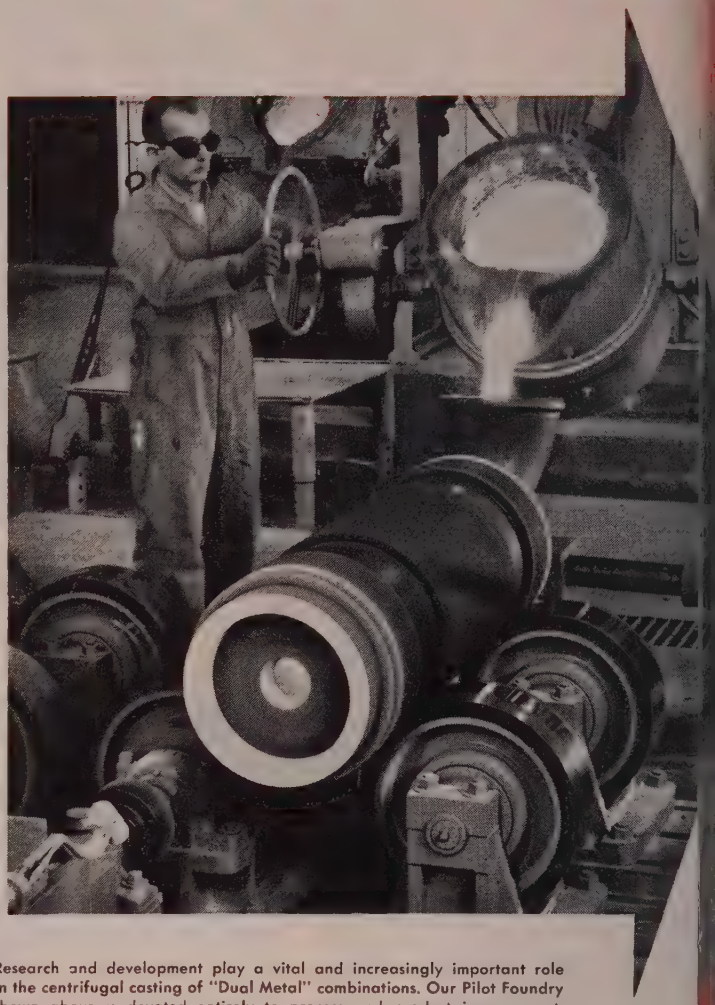
To twenty of America's largest basic industries with problems of abrasion or corrosion—or both—"Dual Metal" means U. S. Pipe's Special Products Division.

Specifically, "Dual Metal" is our name for centrifugally cast cylindrical sections in which two dissimilar metals are bonded metallurgically by centrifugal force and temperature.

"Dual Metal" centrifugally cast, integrally fused combinations of two dissimilar metals are doing industry's most difficult and exacting jobs better and more economically than ever before.

Design engineers have been quick to recognize the outstanding merits of a process capable of combining the desired mechanical and chemical properties no single metal possesses.

"Dual Metal" means versatility, efficiency and economy.



Research and development play a vital and increasingly important role in the centrifugal casting of "Dual Metal" combinations. Our Pilot Foundry shown above is devoted entirely to process and product improvement.

UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

SPECIAL PRODUCTS DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, BURLINGTON

W ANSWER TO AN OLD REFINING PROBLEM

"DUAL METAL" CENTRIFUGAL CASTINGS

less abrasion...longer wear

"Dual Metal" solves one of the petroleum industry's most severe and costly problems—catalyst erosion of lift pipe and catalyst handling lines.

In making a "Dual Metal" lift pipe the outer shell of weldable alloy steel is poured into a rapidly rotating mold. The abrasion-resistant alloy iron core is introduced into a spinning mold at the proper time and temperature. Result? A metallurgically bonded two-metal structure that combines the strength and weldability of low alloy steel and the superior abrasion resistance of alloy iron.

"Dual Metal" lift pipes now in use in 33 of the nation's leading refineries show encouraging evidence of much longer life. In one typical refinery periodic examinations of high temperature catalyst pipes have indicated abrasion resistance of better than 16 to 1 over conventional steel piping. A once-troublesome bottleneck in processing has been eliminated and refinery operations made more efficient and economical.

Perhaps this versatile process is the answer to your particular problem. Write today for specific literature and information on "Dual Metal's" applications for the refining industry.

SIZE RANGES

Outside Diameter	6" to 36"
Wall Thickness	½" and up
Length	Up to 14' without welding

Typical Oil Industry Applications: Catalyst Lift Pipe, Depressurizing Pipe, Catalyst Transfer Lines, Slush Pump Liners, Valve Nozzles, etc.

...with corrosion-resisting WELD OVERLAY

For West Virginia Pulp & Paper Company, Graver recently completed three pulping digesters 11′ 3″ in diameter by 42′ 9″ over straight shell. To guard against localized corrosion, a portion of the top shell and head plates was overlaid with a succession of solid stainless weld beads.

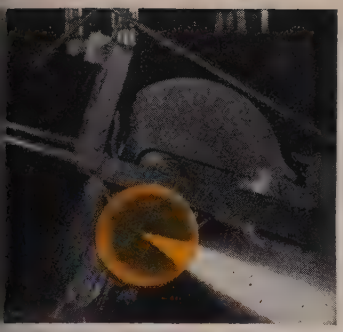
One of the most serious corrosion problems for the pulping industry in recent years has been the corrosion of carbon steel digesters. Severest damage is generally found in the top head and bottom cone areas. However, the location of these vulnerable areas in a digester depends upon a number of variables, including plant filling and cooking practices. An effective method of protecting against rapid localized attack is suggested in the overlay of a thin corrosion-resistant layer of weld metal. This procedure can be applied both to older vessels and to new vessels. Such protection, while not uncommon in other industries, is unusual in the paper industry. The selection of Graver for this specialized fabrication re-emphasizes Graver's reputation for unexcelled craftsmanship.

GRAVER ... *fabricators in steels and alloys*

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

NEW YORK • CHICAGO • PHILADELPHIA • ATLANTA • FONTANA, CALIF.
DETROIT • CLEVELAND • PITTSBURGH • HOUSTON • CATASAUQUA, PA.
SAND SPRINGS, OKLA. • CASPER, WYO. • ODESSA, TEXAS
LOS ANGELES • EDGE MOOR, DEL. • TULSA • SAN FRANCISCO



your swing frame grinding, Norton els take heavy pressures and high eds in stride. Their fast, clean-cutting on and extra long life assure more al through your cleaning room per n-hour.

your bench and floor stand grinding, ton wheels combine exceptional cut- qualities with consistent wheel iomy in a way that makes your grind- look good and your costs look better.

many other grinding jobs, use Norton lon-Reinforced Hub Wheels — BD d and BFR semi-flexible. For work ging from notching risers to weld fin- ng, they're the lightest, easiest, safest eels made.

NORTON

ABRASIVES

Making better products... to make other products better

de-Marks Reg. U. S. Pat. Off. and Foreign Countries

For your portable grinding, Norton wheels have the inbuilt balance that reduces vibration and bounce, and makes them "hug that work." Results are faster grinding, longer wheel life, less operator fatigue — advantages that show up in your profit column. Use Norton ALUNDUM* abrasive on steels and steel alloys, CRYSTOLON* abrasive on gray iron and nonferrous metals.

Brighten your rough grinding picture with this profit-boosting "TOUCH of GOLD"

Profits from grinding actually begin with the first, most basic grinding operation — snagging. Yet the profit-potentials of rough grinding are apt to be more neglected than any other.

In your own rough grinding, Norton wheels can help bring every job up to its proper money-making level. Because you can get Norton wheels that are exactly right — in abrasive, in bond and in every other detail — for best results on all your jobs.

For proof, test Norton wheels against any others, under the same conditions. Your operators will like their easy-handling, clean-cutting action. And *you'll* like the way they grind off more metal per dollar, turn out better work and increase your production — bringing the real, profit-boosting "Touch of Gold" to your rough grinding.

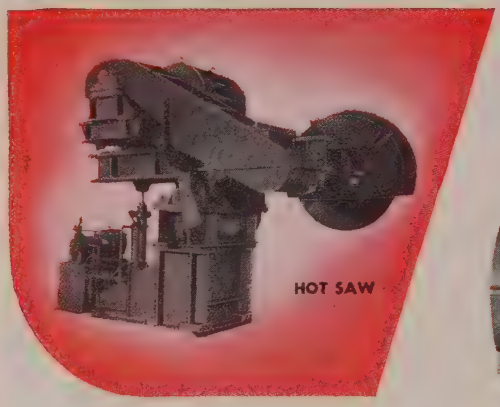
Your Norton Distributor

will gladly help you select the right wheels for your jobs and your machines. If necessary, he'll call your Norton Abrasive Engineer for expert advice on new or difficult applications. And with the world's broadest line to choose from, you'll get the wheels you need for better, lower cost grinding.

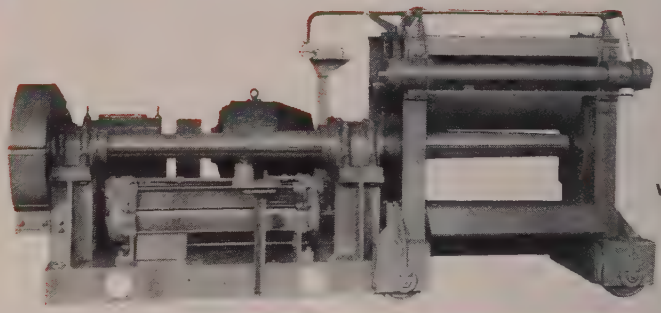
Booklet No. 1405 contains over 50 illustrated pages, with detailed information covering every phase of rough grinding — including *your* jobs. Get it from your Norton Distributor. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1543

F&M BUILDS MODERN MILL EQUIPMENT

designed to do a better job



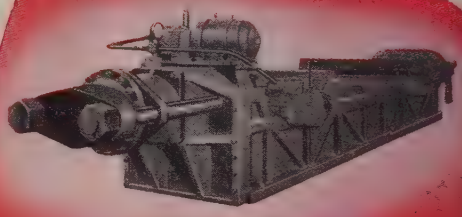
HOT SAW



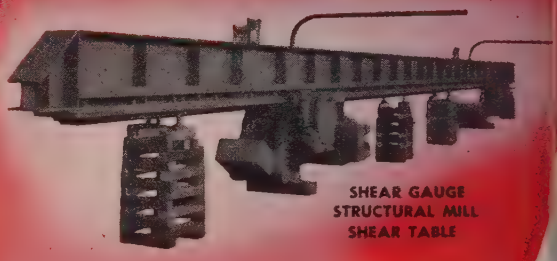
SCRA
WIND

Products of Proven Performance

- HYDRAULIC SLAB AND BILLET PILERS
- STRIP AND SHEET OILING EQUIPMENT
- SHEET SCRUBBER AND CLEANING LINES
- HOT SAWS—ROCKING AND SLIDE TYPES
- HOT BEDS—COOLING BEDS—TRANSFERS
- BILLET EJECTORS—PINCH ROLL STANDS
- SLITTERS—SPECIAL SHEARS AND GAUGES
- TILTING TABLES—Traveling and Lifting Tables
- Continuous PICKLING Lines—ROLLER LEVELERS
- FURNACE Charging Equipment—Furnace Pushers
- Strip Steel COILERS and REELS—SCRAP BALLERS
- RAILROAD Spike Forming Machines—ROLL LATHES
- Sheet GALVANIZING Lines—Wire Patenting Frames
- Stretcher Levelers—Angle and Shape Straighteners
- Rolling Mill Tables—Gear and Individual Motor Types
- PARALLOY ROLLS (Pinch, Coiler, Tension, Steel Mill)
- DUCTILE CASTINGS (80,000 PSI.)



800,000 - STRETCHER LEVELER



SHEAR GAUGE
STRUCTURAL MILL
SHEAR TABLE

PARALLOY ROLLERS

Machinery Built to Customers Design and Detail Drawings

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

Mixing bowls made of Crucible stainless steel by American Car and Foundry Company, at its Milton, Pennsylvania plant.

CRUCIBLE STAINLESS STEEL

keeps its shine

after long, hard wear...

The fact is stainless steel improves with wear, for the more it is used the harder and smoother the surface becomes. And there is never any surface plating to wear on a stainless product, for stainless steel is *stainless* all the way through.

Yes, Rezistal® stainless is a *natural* for products that must take long hard service, or that must resist corrosion or wear, or stand up under daily cleaning with strong detergents. Take, for example, the stainless mixing bowls shown. They'll give many years of trouble-free service. And their smooth, sanitary surface makes them especially suited to the processing of baked goods, candy, cosmetics or chemicals.

Be sure you take advantage of all the money- and time-saving qualities of stainless steel. And be sure you specify Crucible stainless . . . made by the country's leading producer of special purpose steels. You'll get fast delivery of the grade and size you need when you call Crucible.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking

STAINLESS STEELS

RUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

EX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

For FAIRLESS WORKS

Koppers designed

FAIRLESS WORKS of United States Stee Corporation, located at Fairless Hills Pennsylvania, is generally recognized a one of the best-designed steel mills in th world. Koppers Company is proud to hav designed one of the major components o this plant—the steelmaking department.

Koppers designed the Fairless open hearth shop and performed the principa construction thereof. This open-hearth shop is equipped with all of the most mod ern automatic equipment, controls and instruments. The open-hearths—nine in all—are housed in a main furnace building

is 1,287 feet long and 88 feet wide. n hearth, at sill level, is 60 feet long by eet 6 inches wide, measured inside the kwork. This gives a hearth area of 0 square feet.

he Fairless open-hearths are among argest capacity furnaces of their type. h furnace was designed for a heat of 275 net tons; however, hearth was made ample so that each ace is presently rated at 290 tons. ed annual steel-producing capac- or the nine furnaces is 2,200,000 tons.

Designing and constructing open-hearths is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

KOPPERS®

Engineering and Construction Division

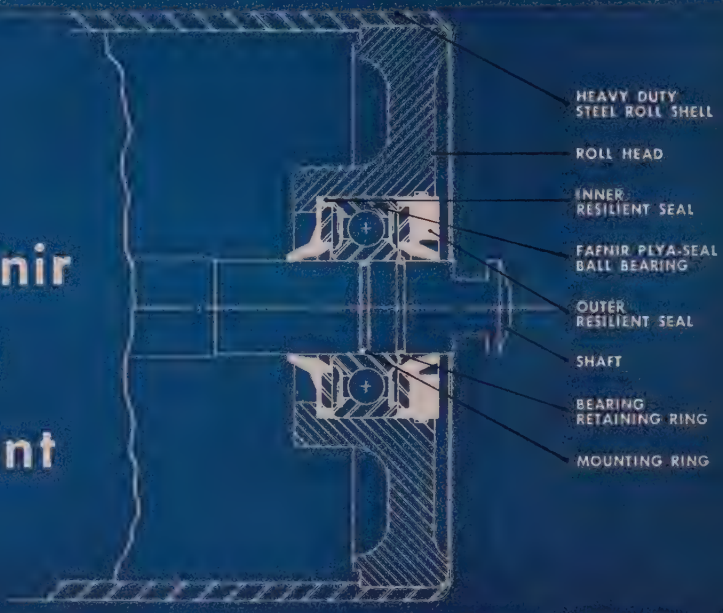
KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

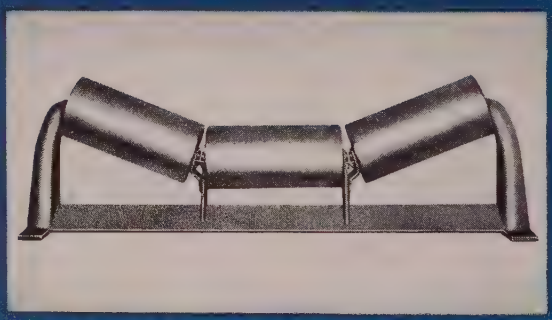
n-hearth shop of Fairless Works, Fairless Hills, Pa. It houses nine open-hearths, designed by Koppers Company.

is open-hearth shop

Trouble Fixed Fast...

by Transall-Fafnir Idler Roll Development





The all steel, jig welded frame of this troughing idler insures roll alignment and facilitates belt training. Each idler roll is equipped with two Fafnir Plya-Seal Bearings.

Fafnir-equipped Transall Conveyor for Mine Run Coal. In daily operation since December 1949 . . . 2600 bearings without a bearing failure to date.

Things began to happen when Transall Designers asked Fafnir Engineers to join them in solving a troublesome conveyor problem. By pooling their experience, the answer was found quickly and simply . . . an improved idler roll with advantages beyond anything available.

Right from the start, the problem was simplified by centering development around Fafnir Plya-Seal Ball Bearings. Factory lubricated and sealed for operation between —60°F. and +200°F, Fafnir Plya-Seal Bearings never need relubrication. The seals are unaffected by moisture and many other contaminants.

Extra insurance against abnormally severe conditions was provided by chrome plating the bearing inner ring to prevent corrosion and abrasion at the point of seal . . . and by the addition of supplementary, resilient bearing closures.

It's another example of the Fafnir "attitude and aptitude" . . . a way of looking at bearing problems from the designer's viewpoint and the ability to supply the right bearing for the need. If you have a bearing problem, why let it drag. Bring it to Fafnir like most people do. Maybe your trouble can be fixed fast. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

NOW WE FORGE IT

DESPITE ITS LARGE SIZE AND INTRICATE SHAPE

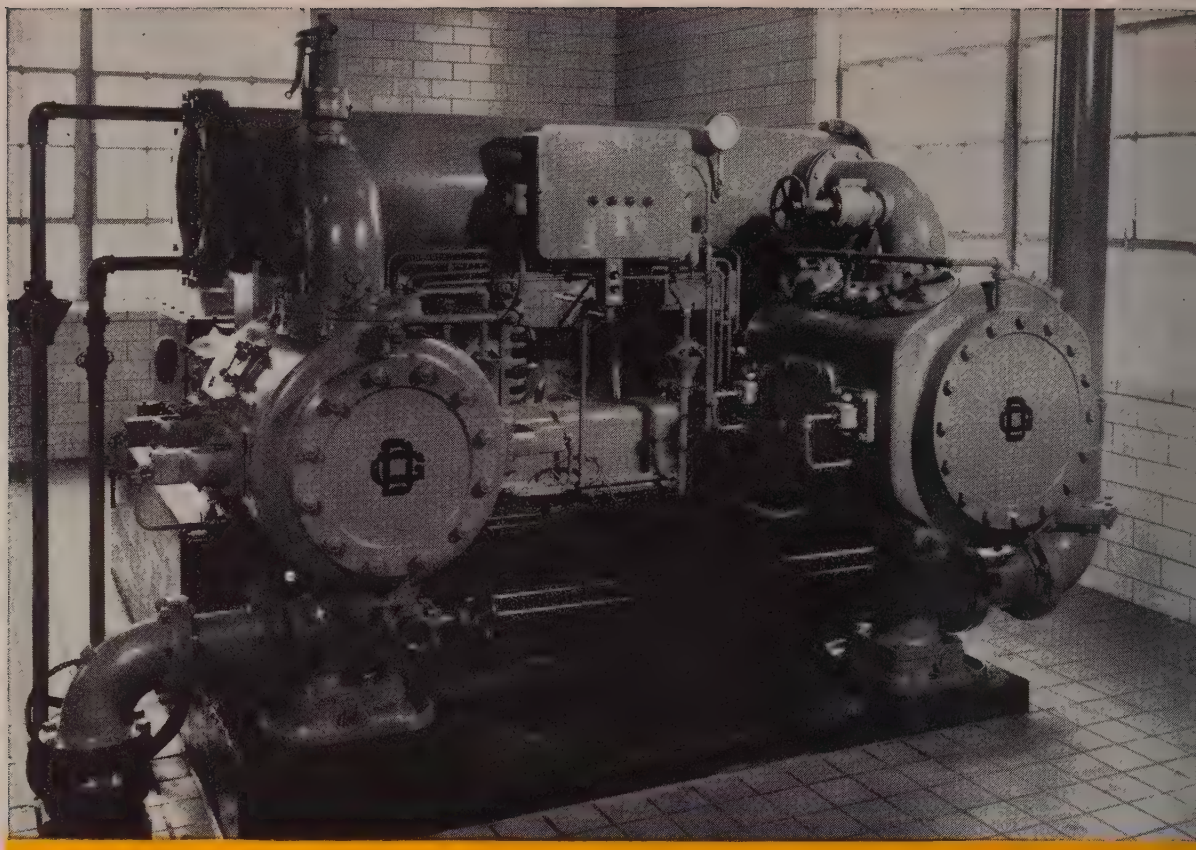
The CAMERON closed die extrusion forging process opens the door to a great many design features which heretofore had been limited to castings. The improved quality and the lower manufacturing cost which result from machining a CAMERON forging makes it highly desirable to investigate the possibility of your product being forged at CAMERON.

For further information write

FORGE AND ORDNANCE DIVISION

Cameron

IRON WORKS, INC.
HOUSTON, TEXAS



Model HA—468 to 1854 cfm—Bulletin HAC-36

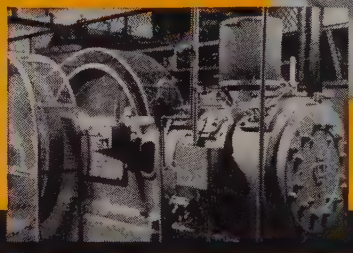
Model AA—32 to 183.6 cfm—Bulletin AA-5

Cutting overhead down to size?

A new Gardner-Denver in your compressor room can eliminate a big part of your air compressor maintenance—may reduce operating costs as well.

Let us tell you about a recent installation which is actually saving thousands of dollars per year.

Model RX—89 to 1292 cfm—Bulletin HAC-40



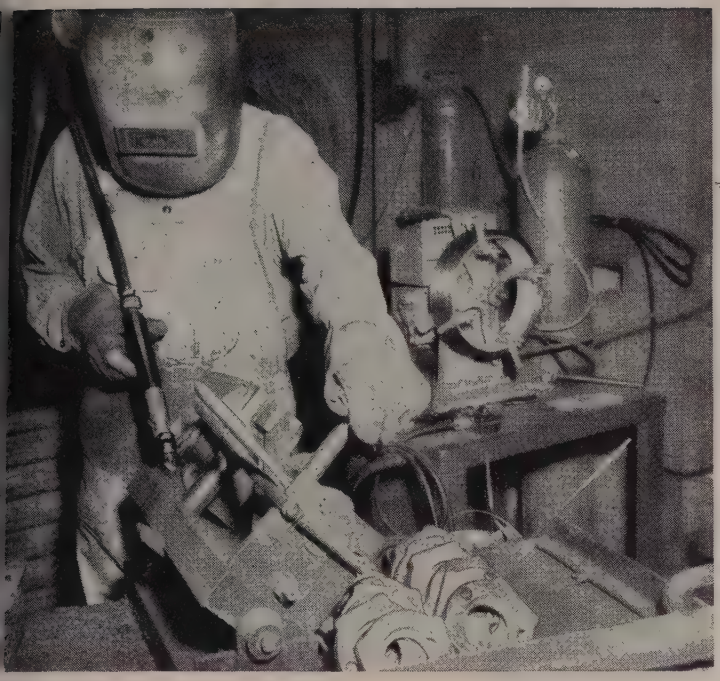
SINCE 1859

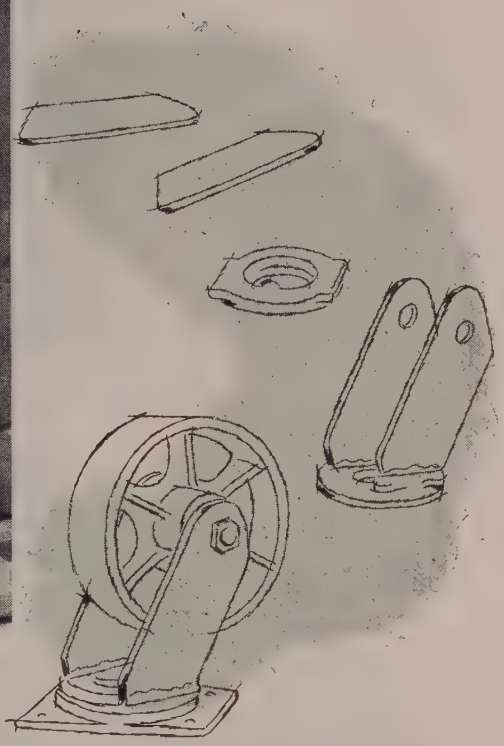
GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., 14 Curity Avenue, Toronto 16, Ontario





SIGMA WELDING BOOSTS STEEL FABRICATION 100%

A manufacturer of steel truck casters, has doubled his production from 400 to 800 units a day— by changing to sigma welding.

Average welding speed is 120 in. per minute—Once clamped, the parts are welded in less than ½ minute.

Used as welded—Free from spatter and flux entrapment, the need for finishing is eliminated.

Cut costs—Fewer production steps have made possible labor savings up to ½ the former costs.

Sigma welding is just one of the welding processes developed by LINDE's research and years of experience. HELIARC, sigma, and UNIONMELT welding form a top notch fabricating team which is now setting a new peak in industrial production. For small shops or huge production lines, from carbon steel to complex alloys and non-ferrous metals—there is a LINDE electric welding process to do the job efficiently and economically. Your local Linde representative will help you determine the best welding process for your job. Call him today for more information.

Linde
TRADE-MARK

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Principal Cities

In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited

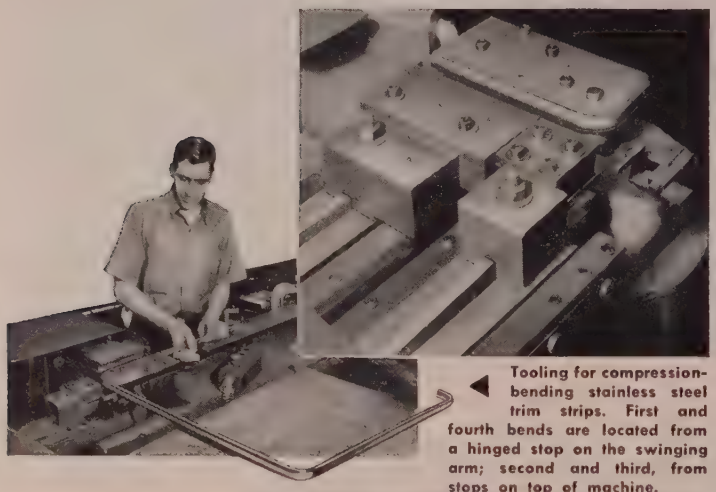
"Heliarc," "Unionmelt" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

TRIM MOLDINGS PRODUCED 58% Faster

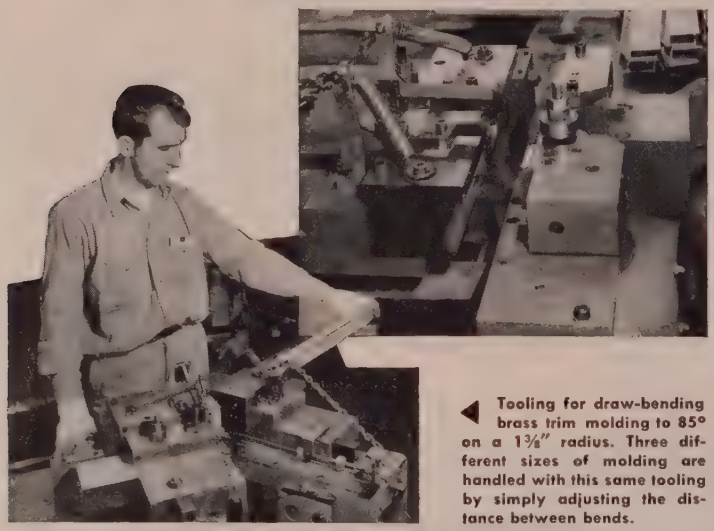
AT
ACME-LEES DIVISION
ON

PINES SIZE 3/4 AUTOMATIC BENDERS

Bending department at Acme-Lees, showing two Size ¾ Pines Machines in operation.



◀ Tooling for compression-bending stainless steel trim strips. First and fourth bends are located from a hinged stop on the swinging arm; second and third, from stops on top of machine.



◀ Tooling for draw-bending brass trim molding to 85° on a 1⅜" radius. Three different sizes of molding are handled with this same tooling by simply adjusting the distance between bends.

SKILLFUL TOOLING PRODUCES SMOOTH 1½" RADIUS BENDS IN .020" TYPE 430 STAINLESS STEEL

Here's a typical result story indicative of th bending skill of Acme-Lees Division, Munci Indiana, specialists in fabricating decorati trim moldings and extruded shapes fo Appliance and Automotive Manufacturer On a Size ¾ Pines Automatic Bender, .02 Type 430 stainless steel trim moldings a now formed with four unusually smoo 90° bends to a 1½" radius. Production spe is today 58% faster than by former manu bending methods. Current production rated at 456 bends per hour as compare to 288 by manual methods.

HYDRAULIC ACTUATION REDUCES SCRAP LOSS

As shown, the tooling is accurately machine to fit the shape of the delicate molding. bronze wiper shoe eliminates marring t exterior finish. The operator simply positio the workpiece and starts the hydrau clamping and bending cycle by push butto The uniform, dependable hydraulic stro of the Pines Bender assures fast, accura bends which reduce scrap losses and simpl assembly problems.

INVESTIGATE PRODUCTION BENDING

If you have bending work with tubing, pi bars, extruded or rolled shapes, it may p you to tool for production bending t "Pines-Way". Pines engineers will wo with you on any bending problem with obligation.

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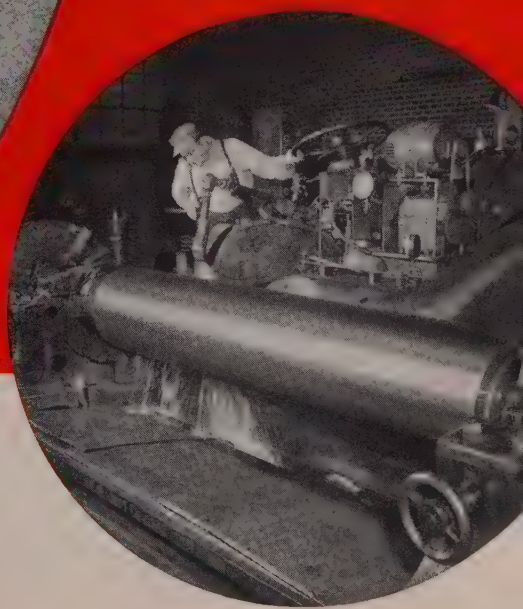

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Contact the nearest ELECTROMET office for further information on how you can save with "EM" briquets.

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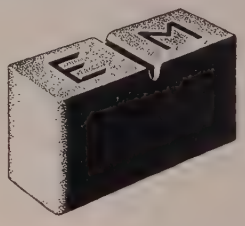
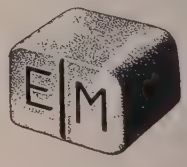


SILICOMANGANESE



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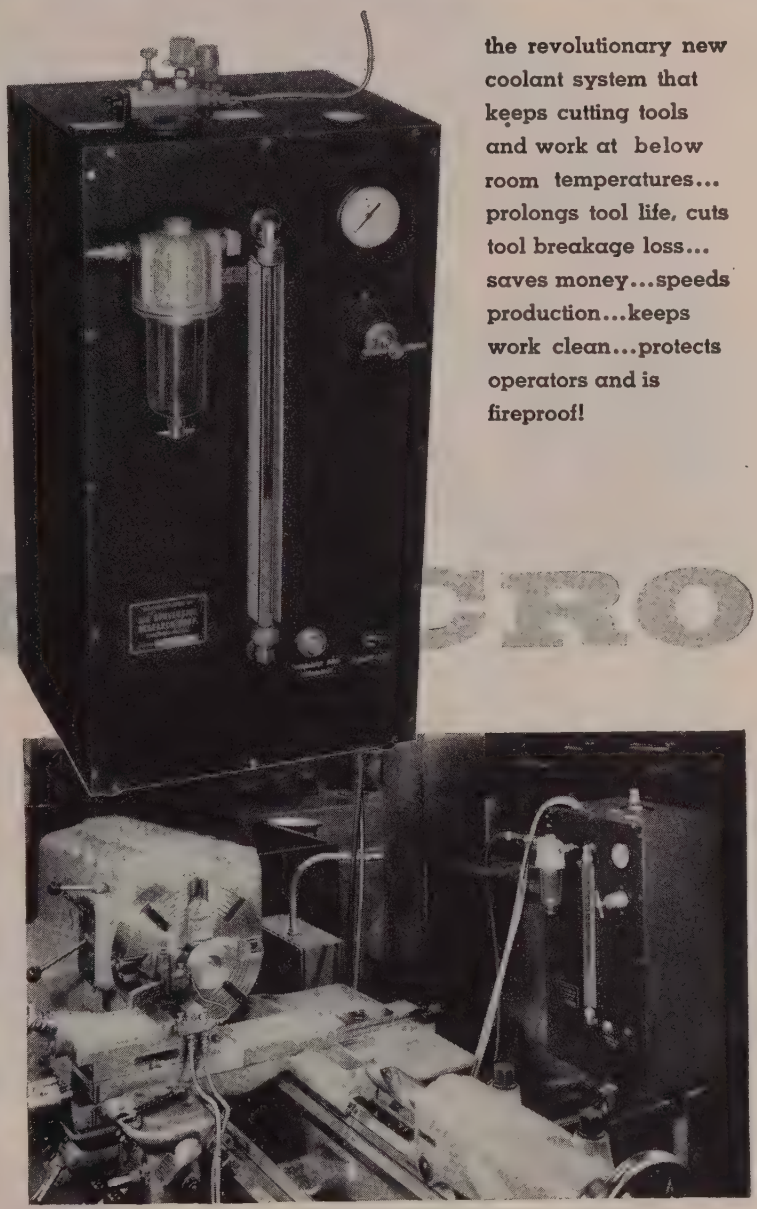

the revolutionary new coolant system that keeps cutting tools and work at below room temperatures... prolongs tool life, cuts tool breakage loss... saves money...speeds production...keeps work clean...protects operators and is fireproof!

lore efficient and adaptable—with sepa-ıtely controlled multiple spray heads. One ozzle can produce a true fog spray while nother gives a liquid stream.

asier to regulate—master panel control now ıakes every adjustment simpler, much ıore accurate. Spraymix control, attached y flexible tubes to top of unit, makes for asy positioning and precise, constant spray ontrol.

lore compact—all controls, regulators, auges are **in one place,** at the operator's ngertips.

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there's a Lo-Jet Acro system for every purpose, every machine— write now for details!

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Gentlemen: Please send me full information about the new Lo-Jet Acro mist cooling system.

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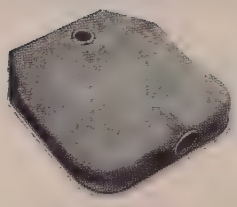
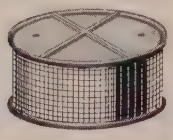
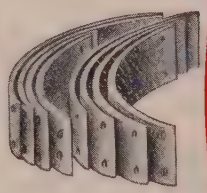
FOR BETTER PERFORMANCE

in your product, too

No part of a precision performance product can ever be of dubious dependability. Automobile, aircraft, and other modern industries demand precise specification materials for all parts, however small. Industrial wire cloth goes into so many vital parts. It can't be just wire cloth. It should be Reynolds Wire Cloth. Precision-processed to the last detail—exactly to your specifications—to meet specifically the requirements of your individual parts, or products, and their uses. For details see *Sweet's Product Design File* ... or consult Reynolds Engineers.







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NS NATIONAL-STANDARD Company NILES, MICHIGAN

REYNOLDS WIRE DIVISION, NATIONAL-STANDARD CO., Box 300, **DIXON, ILL.**

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ATHENIA STEEL...*Clifton, N. J.*.....Flat, High Carbon, Cold Rolled Spring Steel
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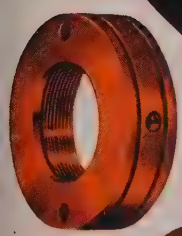

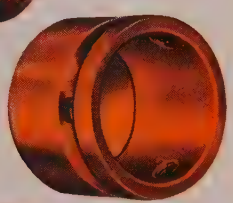

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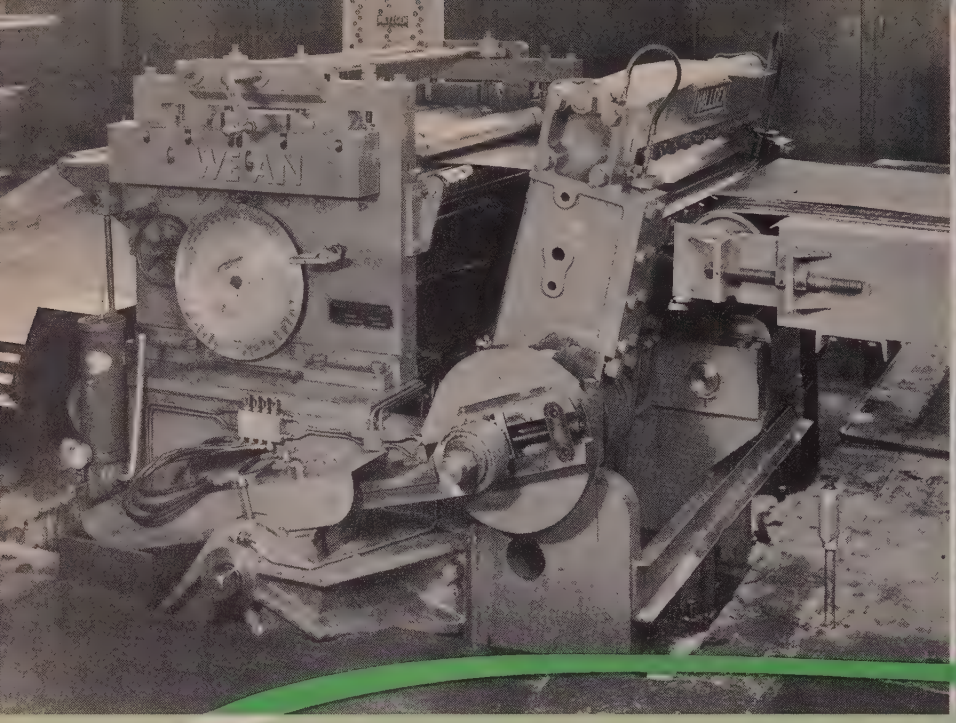
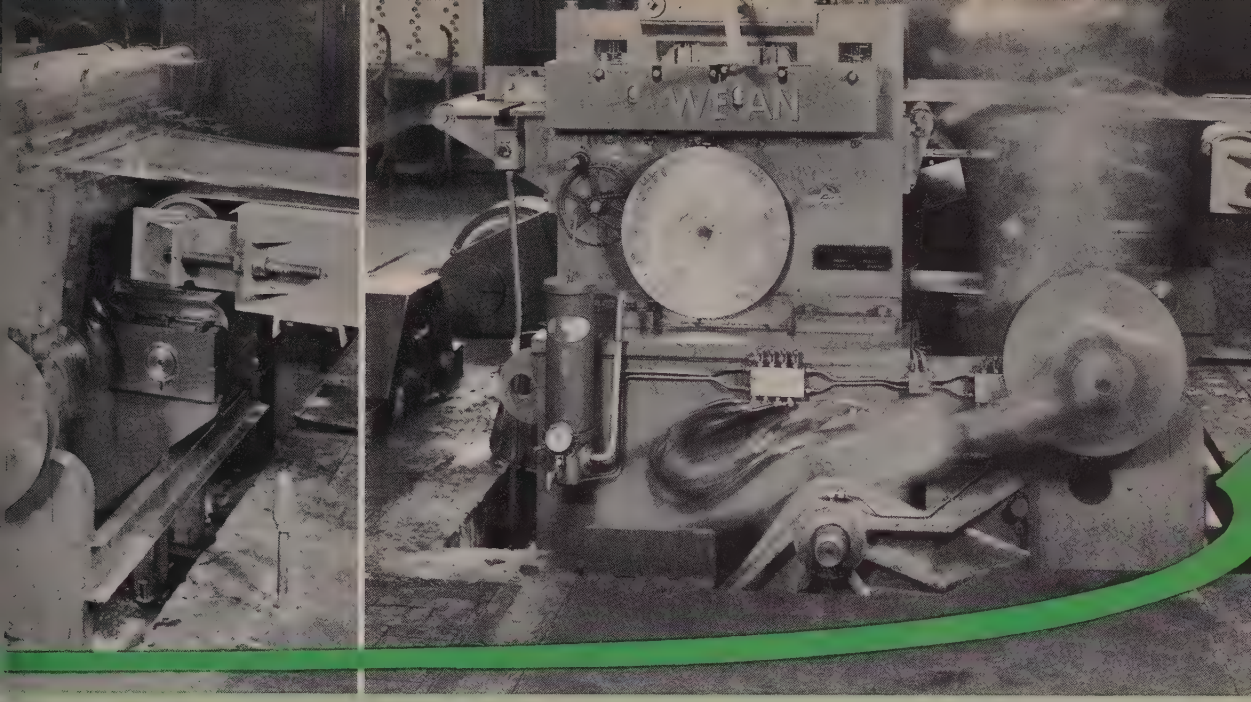


Here's the Amazing
That Makes 100 Cuts Per Minu

Saves Bulk Steel Users $20 a Ton

Wean salesmen have a quick and painless method for actually showing you, using your own figures, how, by purchasing steel in coil form, you can save in the neighborhood of $20 per ton on your steel costs. This is an offer you can't afford to overlook. If your plant is situated in an area where a Wean Line is operating we invite you to see it in operation ... talk with the people who operate it ... and we're sure you'll want this great system in your own plant.



Resquared Tolerance

e-hundred cuts per minute to re-
ared tolerances . . . that's what
rs of the amazing new Wean
ipment Flying Shear and Slitting
em are getting. That's why, if
are using steel in sheet form, it's
ortant to you to get all the facts.

purchasing steel in coil form
minimize the mill extras — that
etimes amount to more than
00 per hundred weight. You re-
e considerably both the per-
nel required to handle and in-
tory large steel stocks and the
ce needed to store various cut
sizes of steel of the same gauge
and analysis.

And this Wean System provides you with faster production. Here is a shear line that will cut to tolerance at the rate of 100 times per minute. Measure this against your present squaring-to-multiples rate and you'll quickly see how a single Wean line can keep a bank of high speed presses in constant operation.

SEE IT IN ACTION . . . YOU'LL AGREE

There's no comparison! The Wean Combination Slitting and Shearing Line is absolutely the last word in speed, precision and automatic operation. Before you buy let a Wean Equipment man show you one of these lines in operation. Talk with the operators. You'll be convinced. Simply contact the Wean office nearest you. They're listed below.

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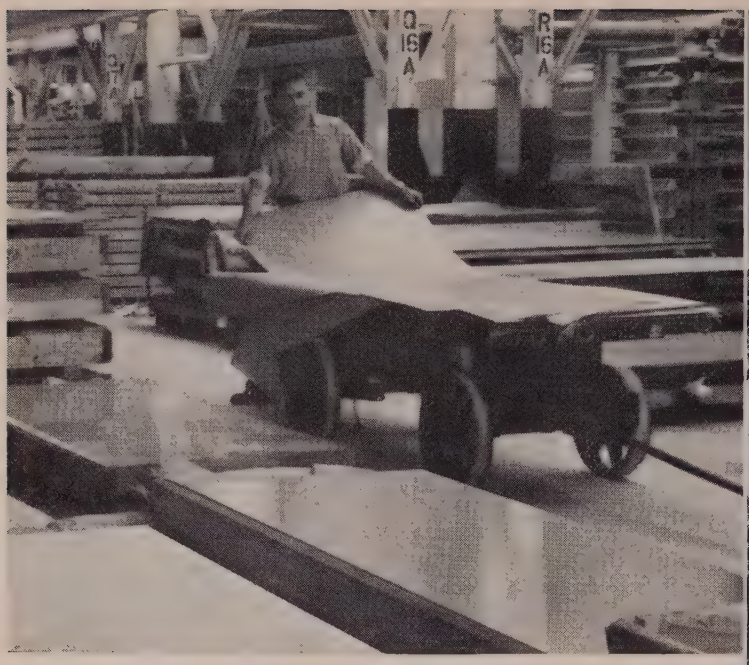

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2221 kinds, forms, finishes and sizes in our stock for quick shipment

So much improvement is being made every day in stainless. New extra-low carbon sheets and plates for special welding requirements, light plates for polishing and stainless tubing to name but a few. You may not be using the exact type that is best from a fabrication, long life or cost standpoint.

So we urge you to let our Ryerson stainless specialists help you select the right type for each particular purpose.

And whether you need stainless, or any other kind of steel, depend on Ryerson for immediate delivery from stock.

STAINLESS IN STOCK

SHAPES: Sheets & Strip • Plates • Rounds • Squares Flats • Hexagons • Angles • Pipe • Tubing Fittings & Fastenings

TYPES: 301, 302, 303-C, 303-S, 304, 304-L, 309, 310, 316, 321, 405, 410, 416, 430, 430-F, 440-C

CONDITIONS: Hot Rolled, Cold Drawn, Centerless Ground

FINISHES: #1, #2B, #2D, #3, #4

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Metalworking Outlook

Steel Settlement Near?

The steelworkers' wage policy committee is scheduled to meet tomorrow to approve or reject an offer by U.S. Steel Corp. If the group approves, the 1954 contract settlement for U.S. Steel and most of the other basic producers probably will be for a small wage increase and improvements in the pension and insurance programs. Chances for committee approval are good but not certain. In the past, it has often done little more than rubber-stamp decisions by the union executives, but since David J. McDonald became president, it has had a greater voice in policy. Tomorrow's meeting comes eight days before the contract termination date of June 30.

Bad Labor Omen

The steelworkers claim their 15 double-spaced pages submitted to U.S. Steel contained "proposals, not demands." Those "proposals" are a blueprint of the union's objectives over the long pull, not just for this year, labor men say. While steel men will welcome a mild settlement this year, some are alarmed about the future. "If those proposals are the steelworkers' serious objectives," says one executive, "we're going to have a rugged time with the union a year or two hence."

Steel Users Calm

If you judge by the almost total lack of scare steel buying, consumers never have been greatly alarmed about either a strike or higher steel prices resulting from the wage settlement. There's now little chance of a strike, but the possibility of higher prices remains. Last year after an 8½-cent settlement, the industry raised finished steel by an average of $4 a ton.

No-Raid Pact: Effectiveness Doubted

Some labor observers question the effectiveness of the much heralded AFL-CIO no-raiding pact. Conspicuous among the nonsigners of the agreement were the AFL's teamsters and carpenters unions and the CIO's steelworkers, three of the most aggressive outfits in the country. What's more, several independents with raiding proclivities, notably United Electricalworkers and United Mine Workers, could also undermine the no-raid pact. In the CIO, 29 of 33 affiliates signed; in the AFL 65 of 111.

Another Look at Distribution

Indicating the growing recognition of distribution's importance in our economy (p. 113), Twentieth Century Fund is mapping a two-year study of the relationship between mass production and mass distribution. Retained to do the job is Reavis Cox, professor of marketing at the University of Pennsylvania's Wharton School of Finance & Commerce. The fund has already done outstanding research in distribution. In 1939 it

published its famous "Does Distribution Cost Too Much?", the first comprehensive analysis of distribution costs.

Second-Quarter Profits To Improve

Second-quarter profits should be up slightly from the first three months of 1954. And the first-quarter earnings were surprisingly good. The combined net income of $1,602,521,683 for 586 manufacturers in January, February and March was 3 per cent better than their net of $1,556,684,360 in the first three months last year. General production volume has risen moderately since March, and net profit will improve accordingly.

More and More Plastics

Production of plastics will double in four years, reach 6 billion pounds by 1958, predicts John J. O'Connell president of the Society of the Plastics Industry. Production of plastics materials will exceed 3 billion pounds this year, equivalent to a dollar volume of about $1.5 billion.

Russians Invent Again

Pravda claims Soviet inventors have found a way to mass produce sheet iron directly from molten pig iron without first casting the iron into ingots. The paper gives no technical details. If there's any truth to the report, the technique could be an adaptation of the direct-chill casting process commonly used in nonferrous mills whereby molten metal is cast into slabs or thick plates and then rolled.

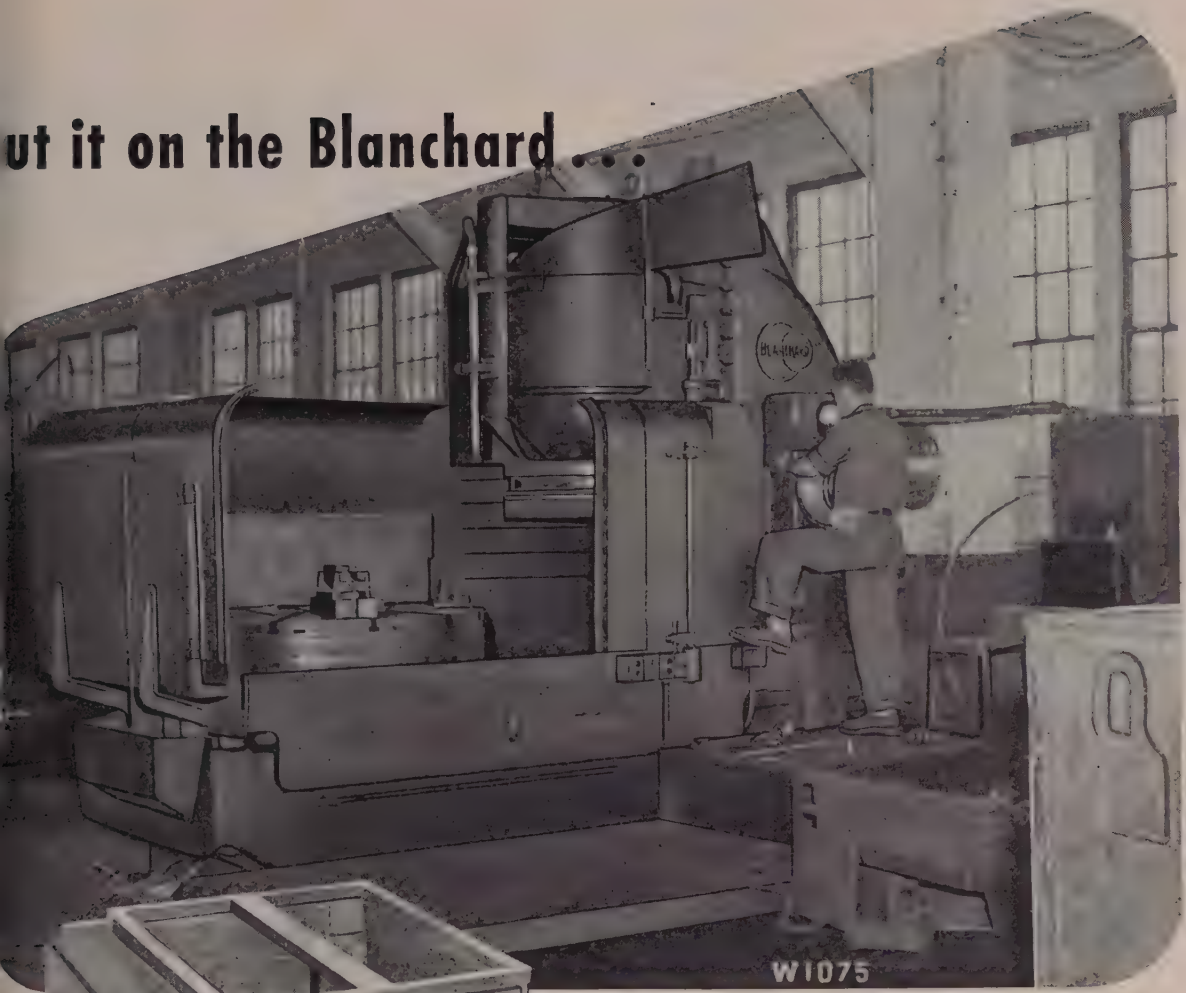
Straws in the Wind

Look for Congress to pass a one-year extension through June 30, 1955, of the 2-cents-a-pound import duty on foreign copper when the domestic price is above 24 cents a pound . . . Some 82 per cent of the Great Lakes ore fleet's tonnage-carrying capacity is now operating . . . Sen. Homer Capehart (Rep., Ind.) is plugging to establish the Export-Import Bank independent of the Treasury department and to increase its lending authority from $4.5 billion to $5 billion . . . Studebaker Corp.'s executive vice president, P. O. Peterson, will spend full time trying to get more defense work . . . During the past year 79 per cent of the new plants costing $1-million or more for which the U. S. granted accelerated tax amortization are being located at dispersed sites.

This Week in Metalworking

Machine tool business will be off about 18 per cent in 1954 from 1953, but builders are still optimistic (p. 73) . . . Electric motor sales in the 1 to 30-horsepower class will drop only 10 per cent this year (p. 74) . . . The overland belt conveyor proposed to run from the Ohio river to Lake Erie is being revived by its sponsors (p. 75) . . . Industrial growth in the Pacific Northwest promises to outrun that of the U.S. generally (p. 77) . . . The U.S. is pulling out of more commercial operations (p. 78), but it will probably continue to run the Texas City, Tex., tin smelter until at least June 30, 1955 . . . Some aircraft companies are diversifying into non-aircraft lines (p. 84).

ut it on the Blanchard . . .



it takes 1/5th the time!

Here is another example of the special jobs Blanchard Surface Grinders perform *in less time,* to exacting specifications.

These explosion-proof control cases are used in the coal mining industry. Each steel weldment case is 36" x 48" x 24" deep. Because gaskets cannot be used, surface finish, and flatness must provide a dust and gas explosion-proof metal seal.

A Blanchard Surface Grinder, the No. 32-60, removes approximately 1/8" of stock — in *one-fifth* the machining time formerly required.

Send a sampling of your parts for free test grinding and our recommendations.

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

HE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Where It Can Save You Money
Yoloy pipe used for radiant heating. Ready for placement of pipe supports, to be installed before pouring concrete floor slabs.

long life underground too

. . . Piping of high strength low alloy steel containing nickel provides multiple advantages

INDUSTRY has widely adopted concealed piping for such diverse applications as radiant heating indoors and removal of snow from city streets.

Regardless of its purpose, however, where buried or concealed piping is involved *only long-lasting pipe can be economical.*

You can see such piping, above, made from the same composition of nickel alloyed steel which has proven so successful in the oil, mining, railroad, chemical, trucking and other industries.

Weldable, and of high mechanical strength, it is produced by The Youngstown Sheet and Tube Company, Youngstown, Ohio, under the tradename Yoloy Continuous Weld Pipe.

In standard tests, Yoloy shows four to six times greater resistance to atmospheric corrosion than does carbon steel. Furthermore, Yoloy piping resists attack from highly sulphurous atmosphere, brine and many other corrosives.

In addition, it resists abrasion and shock to an extent unmatched by any carbon steel of equal strength.

Another valuable advantage . . .Yoloy pipe can be electric or gas welded, readily. And the welds show approximately the same strength and ductility as the parent metal.

Easy to thread and fabricate with standard pipe tools, Yoloy Continuous Weld Pipe is one more example of the improved performance and ready response to fabrication derived from steels containing nickel.

In all sorts of applications, nickel alloyed steels prove to be lowest in ultimate cost. For actually, the many standard grades available make it easy to select exactly the right one to meet any reasonable combination of fabricating and service demands.

Whatever your industry, send us details of your metal problems. We'll be glad to help you with suggestions based on wide practical experience.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N.Y.

How's Your Distribution?

Look around you everywhere and you'll see huge new shopping centers complete with self-service groceries and dime stores, department stores and hardware stores all surrounded by expansive parking lots. They're evidence of the revolution in retailing to reduce the cost of moving goods to consumers, a cost that can amount to half the selling price.

It's a revolution catching on in the distribution of industrial products. It's what advertising and promotion men were discussing in Montreal last week at the meeting of the National Industrial Advertisers Association and the subject of a series of articles in this publication.

There are a great many facets to distribution that need checking to see where wasted dollars can be squeezed out. Let's ask ourselves a few of the questions:

Is the product design right? Even the best sales force can't sell a product that's semiobsolete in utility, servicing and appearance.

Is the product packaged properly? For example, drills and taps are being sold in attractive, transparent boxes so the buyer can see what's inside. And, the gross system is giving way to decimal packaging for small items.

How can the product be sold most effectively? Own sales force? Distributors and jobbers? Manufacturers' agents? Sometimes a combination works out best.

Is the sales force adequate? Is it being well trained and supervised? Are meetings being held frequently enough to enthuse salesmen and keep them informed? Are inquiries being followed? After 13 years, selling again is an art.

Are inadequate stocks of off-the-shelf items losing sales to competitors? Can the product be handled with lift trucks and pallets? Is it being shipped by the lowest-cost, fastest method? Would automatic booking machines help cut costs of office routine and speed up billing?

Are product research and market analysis detecting shifts in customer requirements? Should sales territories be realigned? Are advertising and promotion dollars working hard enough?

Metalworking management has gone a long way in reducing production costs, an area where it is dealing with specifics. But, there's much yet to be done in the less definable area of distribution where further exploration can produce cost savings and make your production lines hum.

Irwin H. Such

EDITOR

PROTECTION: If Uncle Sam is your sole or chief customer, you are subject to queasiness whenever stretchouts or cutbacks are proposed in federal procurement programs. If the cutbacks effected are severe and you have a one-product line you are in trouble.

Major aircraft companies, with a wise eye to the future when military plane requirements

may diminish, are taking out insurance in the form of product diversification. They are developing new lines (p. 84) in electronics, atomic energy and commercial products. Only a handful are still concentrating 100 per cent on aircraft. The thousands of subcontractors and suppliers to the aviation industry will be well advised to note this development and to key their own plans to the trend.

Product diversification is evident in other industries whose major business in recent years has been to supply the armed services. A check by this publication indicates half of them are readying new products. Industry is heeding the old adage, "Don't put all of your eggs in one basket."

* * *

IN STRIDE: Observers of business trends over recent months cannot help but be impressed by the calmness which the business community has undertaken the adjustment from a lush boom to a more normal market. The transition was approached with faith and is being accomplished with order.

Now evidence accumulates that the downturn from the peak of last year is moderate. Plant and equipment expenditures (p. 76) are booming along at a near-record pace, less than 5 per cent behind fabulous 1953. Integral electric motor sales (p. 74) are off no more than 10 per cent. Machine tools, traditionally feast or famine products, are faring better than was expected (p. 73). The trend in metalworking business generally is on a moderate upgrade.

Meanwhile, planning departments in large and small metalworking and metalproducing companies are busy drafting new expansion plans. Many will be launched in the late fifties and will be ready to take care of the anticipated upsurge in the early sixties.

* * *

PROGRAM FOR MANAGEMENT: Post-Korea has brought a great many problems that require careful thought and consideration on the part of management for their solution.

For many months, the editors of STEEL have been roaming the field: 1. to seek out the problems that are most pressing to management, 2. to consult with many authorities on possible answers and 3. to report back to you on their findings.

In 1954, this series has included "Compass for Competition," "Now You Have to Sell," "Build Better Bosses," and "Automation: How Far Should You Go?" In addition to three articles on distribution starting in this issue, there will be others in 1954 on timely subjects.

Last week, STEEL's editors won top national honors in a field of 475 entries for their series of ten articles on management problems published in 1953. While the award is gratifying to them personally, even more satisfying is the knowledge that their judgment in picking and presenting the subjects of interest to you has been confirmed.

* * *

FASTER FINISHES: There's a chance the competitive wedge you've been looking for is in your finishing department. With the help of the hot-spray technique, many plants report they're doing more with improved lacquers (p. 126).

Lacquer is thinned with heat (150 to 160° F) instead of adding extra solvents. Enroute from the gun to the surface being finished, the lacquer cools to room temperature (through atomization), but its solid content (compared to cold-spray coats) is increased anywhere from 40 to 55 per cent. This means fewer coats are needed to get the desired film thickness and manpower requirements for rubbing operations are reduced.

Available lacquers include those based on nitrocellulose, ethyl cellulose, cellulose acetate, high-viscosity vinyl resins and Parlon.

* * *

QUALITY PROGRAM: Ford makes extensive use of nondestructive testing in in-process and end-product quality control (p. 124).

X-rays check welds, castings and bearings; radiography is used in the development of commercial casting procedures; magnetic particle tests are made on all highly stressed ferromagnetic parts in the aircraft and tank-engine programs; the surface temper technique keeps a watch on abusive grinding; fluorescent penetrant inspection takes in welds, castings, bearings and cutting tools; and ultrasonics are relied upon to find metal thickness.

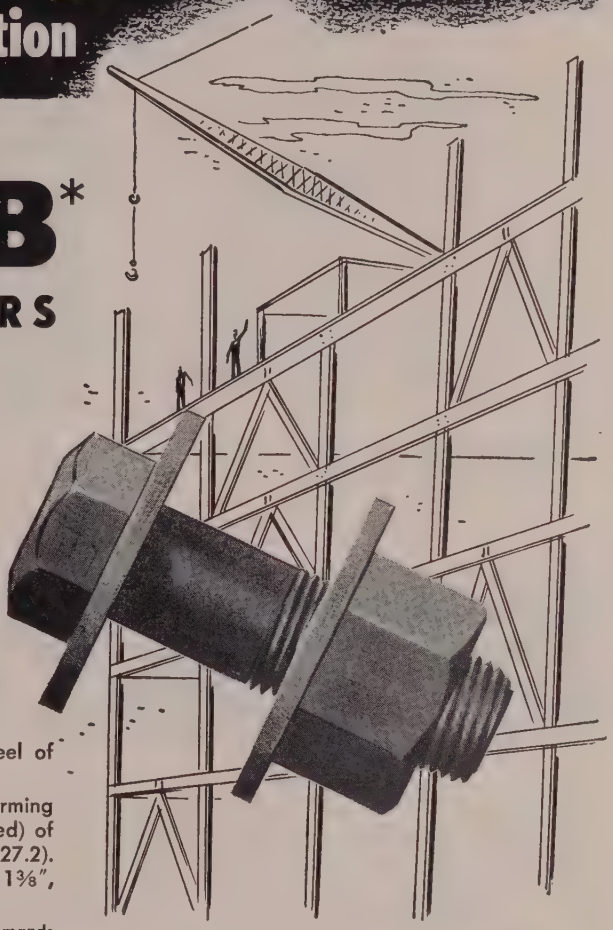
Example of savings: Magnetic particle inspection follows rough turning; so defective material is weeded out before expensive finishing operations are performed.

There IS Something *NEW* and *BETTER* in WASHERS for Structural Steel Fabrication

...Introducing

MIL-CARB*

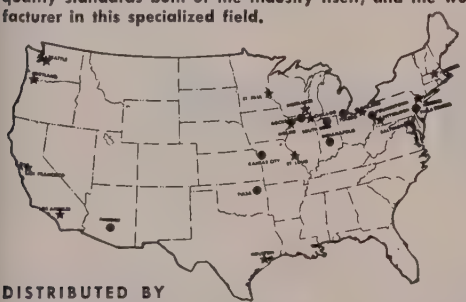
CARBURIZED WASHERS



The rapidly growing recognition and acceptance of the many advantages of Bolted Structural Joints has created a positive demand for a vastly better type of washer—equal in tensile strength and holding power to the best bolt-and-nut assemblies. The new MIL-CARB Washer definitely meets this need.

- MIL-CARB Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, insuring uniform quality control, always equal to the rigid specifications (ASTM Designation: A325, applying to nuts, bolts and washers).
- Proper carburizing permits *securing* and *permanently holding* the desired tension in high-strength structural bolting. Uniformity of hardness is assured by absolute grain-size control.
- MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.
- MIL-CARB Washers are flat and smooth, dimensions conforming to current requirements for heavy plain washers (carburized) of the American Standards Association (ASA Designation: B27.2). These washers are available in six sizes, from 5/8" to 1 3/8", packed in 200-lb. kegs.

Here, in complete harmony with the constantly growing and critical demands of the structural steel building industry, is a Washer made to the exacting quality standards both of the industry itself, and the world's leading manufacturer in this specialized field.



MIL-CARB Washers are available through all U. S. Steel Supply distribution outlets.

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NO BOLT IS ANY BETTER THAN ITS WASHERS

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WROUGHT WASHER MFG. CO.

THE WORLD'S LARGEST PRODUCER OF WASHERS

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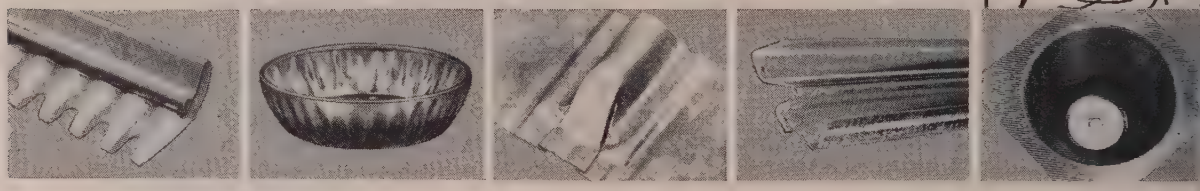
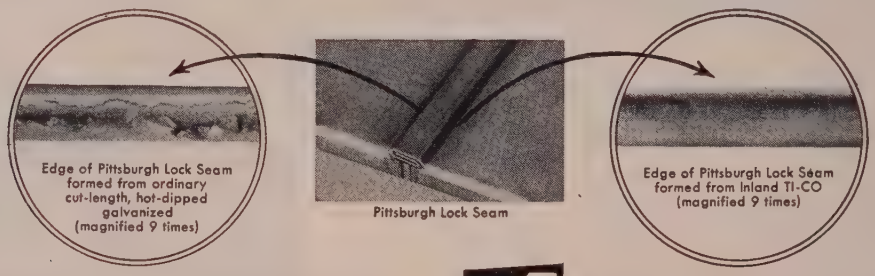
whatever you're making from galvanized sheets, INLAND TI-CO® will make it better!



Whether your products require stamping, drawing, spinning, bending, crimping or lock-seaming, Inland TI-CO will make them better, longer lasting, at a lower cost.

The secret lies in the TI-CO process that produces a sheet with A ZINC COATING THAT WILL NOT FLAKE!

Here's proof: The most severe forming operation demanded of a galvanized sheet is the Pittsburgh Lock-Seam. The enlarged photographs below tell their own story of what happened when ordinary cut-length, hot-dipped galvanized and Inland continuous process TI-CO were put through the same Lock-Seam Test.


Edge of Pittsburgh Lock Seam formed from ordinary cut-length, hot-dipped galvanized (magnified 9 times)
Pittsburgh Lock Seam
Edge of Pittsburgh Lock Seam formed from Inland TI-CO (magnified 9 times)

Manufacturers who have switched to TI-CO report considerable savings in elimination of redipping after forming, in machinery "down time" caused by zinc clogging and in substantial reduction of rejects. They have a more attractive, a more saleable finished product too!

Get the whole story on how TI-CO can help you produce better galvanized products for less—and turn out new products not practical with ordinary galvanized sheets. Write today for new TI-CO catalog.

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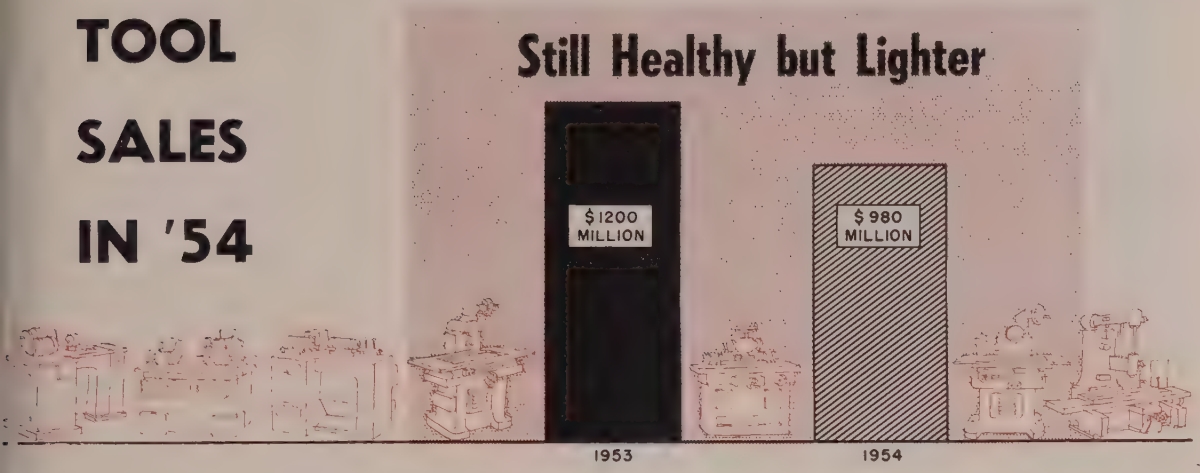
INLAND **TI-CO®... WITH THE ZINC COATING THAT ROLLS WITH THE PUNCH**

TOOL SALES IN '54



STANDING at the halfway point in 1954, machine tool builders look both ways and see this year as a good, normal one. Although machine tool business is off almost across the board, as compared with 1953, most builders see it as a step back from a peak to a still-healthy level.

While some builders are really hurting for business, the general picture shows little gloom in the builders' circles.

The Drop—In reply to a STEEL survey, builders indicate that sales will drop an average of about 18 per cent this year from the 1953 level. With production still relatively high, backlogs already have dropped from an average of more than 7 months at this time last year, to less than 5 months now.

Specials Hold On—Builders turning out special-purpose machines report a better sustained business this year than do the producers of standard machine tools. Reported drop for the specials averages about 12 per cent as opposed to the 24-per-cent average for standard machine builders.

With part of the aircraft industry now tooling up for new jobs and with the automotive industry still buying, special-purpose machine makers, who count these as heavy customers, look for 1954 to hold up. Also, the general trend toward automation in all industries is helping to keep this group of equipmentmakers in the blue chips.

Scattered Pattern — Interesting note in the returns to the survey is the wide variation in figures reported. Although the majority were close to the averages, some reported extremes.

Backlogs, for instance, vary from those in companies which can virtually ship from stock to those having a backlog of more than a year at present production rates. No general pattern explains this variation. One lathe manufacturer may have a backlog of 3 months while another enjoys one at least twice as long. Size is no clue either. One large builder has a 1½-month backlog while another, about the same size, indicates his at 14 months.

Sales Gap—A similar scattering is found in the reports on expected sales for this year as compared with 1953. Low man reported his sales would be down about 60 per cent. Another expects his sales to double this year. Both of these figures were reported by manufacturers of standard machines.

As for the gap between special and standard units, one manufacturer who makes both says, "By the end of the year we should not be off over 30 per cent of our 1953 volume, and that is based on the fact that despite the relative absence of orders for many of our standard machines, our specials will carry us forward. Like every other manufacturer, we find lots of inquiries, not so many actual orders. We are not down-hearted, and we are proceeding on the basis that where there is smoke there is fire."

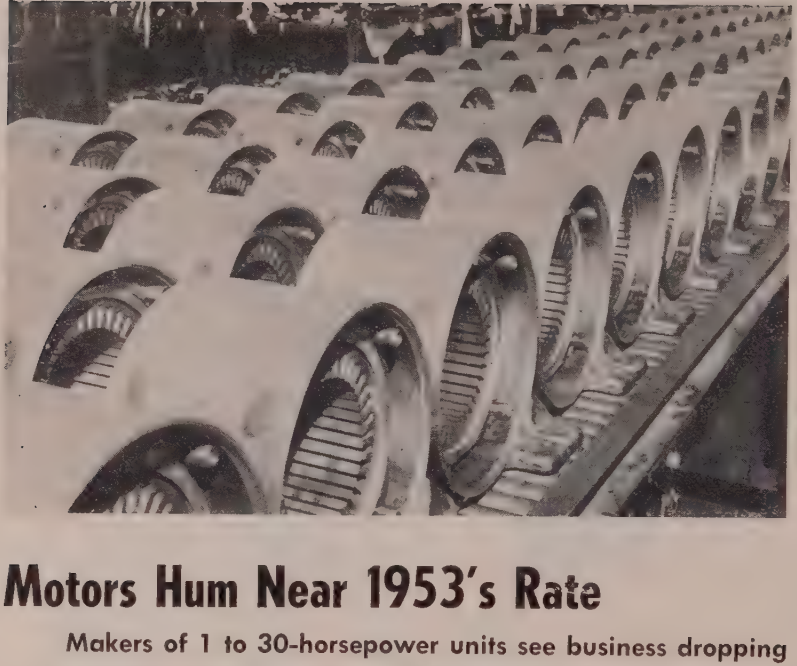
A high level of interest, inquiries and machine quotations was reported by many builders.

Leasing—More than 25 per cent of the machine tool builders answering STEEL's questionnaire indicated that leasing of machines is now, or will be, part of their sales picture this year. Another 7 per cent are considering this sales method and may use it before the year is out.

Many of these companies have not and will not announce formal leasing plans but will discuss individual leasing arrangements with the buyer of the machine if he so desires (see STEEL 3-part series beginning March 29, p. 67).

In Step—As defense buying has dwindled, competition and the need for intelligent, aggressive sales policies have grown. Builders, conscious of the large market for machines to replace obsolete equipment, have redesigned their product for improved performance and have set sales programs to the peacetime pitch.

Like many other goods, machine tools are now bought and sold in a buyers' market. Most important they're bought and sold, and at what appears to be a healthy clip.



Motors Hum Near 1953's Rate

Makers of 1 to 30-horsepower units see business dropping not more than 10 per cent. The rerating program proceeds smoothly. Foreign competition looms

FINGERING THE economic pulse of the AC motor business reveals these symptoms: The rerating program is proceeding smoothly; sales will be off in 1954 but not more than 10 per cent of 1953 volume; foreign competition is mounting.

Rerating Easy—When the hullabaloo of initial resistance died down, motor builders found there was less antagonism to National Electrical Manufacturers Association's decision to bring frame-size standards up to date than the furor had indicated. Many of the volume users of squirrel-cage motors in the 1 to 30 horsepower sizes will buy the old standards as long as they are available (which will be some 3 to 5 years), postponing the day when they will have to rebuild their motor mounts or purchase equipment designed for the new sizes.

Original equipment manufacturers, on the other hand, are pretty happy with the change. For those in the process of redesigning, new sizes offer immediate space and weight advantages. As for the others, they will be able to buy old standards for as long as most of them will be selling their existing lines of equipment.

Sales Sagging — Of the companies STEEL surveyed, most reported an expected sales dip of as much as 10 per cent. At its worst, that could mean $12 million in lost annual sales, but volume would still be $108 million to $110 million in 1954. Even if sales slip that much, 1954 will still be a near-record year for 1 to 30-hp motors, the biggest dollar-volume segment in the motor industry.

Several manufacturers reported either no change in the sales picture or slightly higher volume than last year at this time. Significantly, those claiming the higher marks are those who concentrate on this 1 to 30-hp market to the exclusion of most of the other motors. This group would be inclined to feel an upswinging before the larger, full-line companies.

Like Nuts and Bolts—One growing trend is that of treating motors in this size range as though they were nuts and bolts or some other completely standardized component. "It's gone so far that some customers don't even refer to them as motors on the bill of materials," relates one sales manager. "Only after checking their code do we find that K 105, for instance, is a 5-hp, 215 frame, TEFC motor."

Further amplifying the feeling is the strong tendency to buy those motors on price alone. Unless a customer's engineering department takes a firm stand with re gard to a particular manufacturer purchasing departments have bee taking the lowest bids. Price shad ing to certain original equipmen buyers is reported, though few o the manufacturers will admit it.

Foreign Competition — There' more competition from foreig builders, too. European productio philosophy, based on lots of man power but shortage of materials poses some problems to our ow electric motor industry in dealin with rising foreign activity, bu they're not immediately critical The European's highly efficient us of materials is causing more tha one U.S. motor builder to investi gate his methods. Saleswise, for eign motors are making inroads in applications where there is littl likelihood of their being overload ed beyond their nameplate. Five hp means five hp and no more

And that brings up the matte of nameplate "honesty". As most all domestic motors have up to 20 per-cent overload capacity built into them, users have become ac customed to operating with slight ly overloaded machines. All moto manufacturers in this country state they will continue to give their customers the benefit of this extra capacity, but at the same time there appears to be a grow ing undercurrent of sentiment in favor of a more honest nameplate Threat of an upswing in European competition might well be the chief cause.

Quality Control Men Meet

Some 1500 quality control men gathered in St. Louis last week to assess the status of the 3 Ms (ma terials, machines and men) o their profession, but another vari able, W, (the weather) practical ly stole the show.

During the 8th annual conven tion of the American Society fo Quality Control, a three-day af fair, the thermometer clung to a moist 90 plus. Inside sprawling Kiel auditorium, however, it was a different story. In the made to-order weather there, the ASQC listened to 37 technical sessions viewed 48 industrial exhibits and had three luncheon sessions.

Raymond S. Saddoris of the A. O. Smith Corp. was elected presi

t of the society. His three vice sidents are: Paul A. Robert of ernational Business Machines ., Arthur Bender Jr. of Delco- my Division of General Motors rp. and Julian Toulouse of ens-Illinois Glass. Leon Bass General Electric Co. is treas- r, and Dorian Shainin of Rath Strong Inc. is secretary.

arly Savings: $100 Million

Association of American Rail- ads says 55 of its major research ojects are saving the industry out $100 million annually.

Research by AAR and the rail- ads and their suppliers have re- lted in improved signal equip- ent, diesel locomotives and rail d crosstie life, to name a few.

Today, for example, an operator tting before a centralized traffic ntrol board containing a dia- am of all tracks in his territory -with lights indicating train posi- ons—can regulate the progress trains by merely flipping levers hich set signal lights and witches miles away. Experiments ith television are under way.

New types of locomotives are on e rails including gas and steam rbines. Standardization of freight rs is a big goal with saving of veral hundred dollars a car con- dered possible. Another big proj- t is to improve the solid journal aring.

The use of lower-grade diesel el is being studied. AAR fig- res the industry can knock some 30 million off its $500 million an- ual fuel bill if diesel fuel costing ne cent less a gallon can be used.

elding Takes Over

Entire production of Motor Wheel Corp. in passenger car heels is now by the "electrofuse" elded wheel process with installa- ion of the last of a series of weld- ng machines.

Culminating a program of devel- pment and retooling that cost $1- illion and took about 5 years, the rm has now completely abandoned he traditional riveted method of heel manufacture. Citing the tronger link between the vehicle nd the road, the firm reports it as already made over 10 million heels by the welding process.

Stretching the Seaway

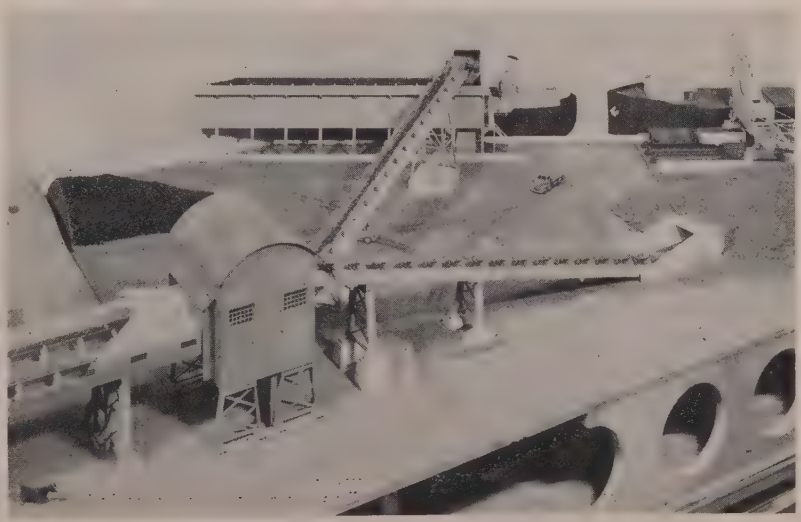
LEGISLATIVE approval of the proposed St. Lawrence Seaway has revived efforts to built a 100-mile-long belt line conveyor in Ohio.

Riverlake Belt Conveyor Lines Inc. officials state that a proposal will be submitted to the Ohio legislature providing for a common carrier status for belt conveyor transportation. Belt conveyor proponents claim that the conveyor "will enhance even further" the economic advantages the seaway will bring to the steel mills of Ohio.

Ore South—Coal North—The proposed belt line will consist of an elevated, two-way conveyor to carry iron ore and coal between the East Liverpool area on the Ohio river and Cleveland. The 18-foot-long model of the conveyor shown in the pictures was built by Goodyear Tire & Rubber Co.

Dr. Paul M. Zeis, Riverlake vice president in charge of research, states that the Riverlake lake terminal volume is estimated at 20 million tons of iron ore and from 7 to 15 million tons of coal annually.

Uphill—Proponents will be fighting an uphill battle over the issue in the 1955 Ohio legislature; previous efforts to secure the common carrier status have failed.



Capital Outlays Maintain Fast Pace

(millions of dollars)

		1st Quarter	2nd* Quarter	3rd* Quarter	4th Quarter
Manufacturing	'54	2,641	3,001	2,779	
	'53	2,747	3,192	2,945	3,392
Durables	'54	1,224	1,414	1,279	
	'53	1,331	1,486	1,376	1,628
Nondurables	'54	1,417	1,587	1,499	
	'53	1,416	1,707	1,569	1,764
Mining	'54	223	262	252	
	'53	225	234	265	288
Railroad	'54	248	248	179	
	'53	313	359	300	341
Transportation (other than rail)	'54	360	343	316	
	'53	337	366	386	376
Public Utilities	'54	910	1,167	1,178	
	'53	925	1,158	1,219	1,246
Commercial, other	'54	1,859	2,014	1,982	
	'53	1,792	1,979	1,984	2,023
9 mos. 1954		6,240	7,034	6,686	
Total 1953		6,339	7,289	7,098	7,666

Source: Commerce department, Securities & Exchange Commission.
* Second and third quarter, 1954, figures are estimates based on reported anticipated expenditures.

CAPITAL OUTLAYS by businessmen for new plant and equipment are booming along at the near-record pace of $27.1 billion annually.

That's less than 5 per cent below 1953's record $28.4 billion. Unless the nation's economic picture changes considerably, expenditures in 1954 could be the second highest in history.

The Comparison—Latest figures (see the table) by the Commerce department and Securities & Exchange Commission show that first-quarter outlays this year were less than $1 million below the comparable 1953 period. Anticipated planned investments reported by businessmen indicate that the rate in both the second and third quarters will be above that of the first period.

Greatest strength with small increases anticipated for the first nine months of 1954 over last year are in mining and the classification "commercial and other" which includes trade, service, finance, communication and construction.

Durables—Not So Weak — Although manufacturing investment indicates a decrease of about 7 per cent from last year, the expenditure cut by durable goods industries is less than expected (see STEEL, Mar. 22, p. 44), while the drop in expenditures by nondurables is a little larger.

In the durable goods industries expenditures for "transportation equipment excluding motor vehicles" shows an increase from $757 million in the first nine months of 1953 to $1076 million for this year. Electrical machinery and equipment outlays are about the same as last year, and decreases are indicated in primary iron and steel, primary nonferrous metals and nonelectrical machinery.

New Air Conditioner

Listing at $345 plus excise tax and installation, an air conditioner for 1954 Ford and Mercury cars is announced by Novi Equipment Co.

Using a Tecumseh high-speed compressor and Freon 12, the unit delivers the cool air through dual outlet ducts. An electrostatic air filter is provided to remove impurities from incoming air and a temperature control regulates the car temperature.

The unit can be installed in six or seven hours, according to Novi Equipment, with location of components in trunk and under the hood comparable to GM and Chrysler units.

Watch for air conditioner prices to take a sharp tumble next year, incidentally, in the face of low-priced competition and growing volume.

Hassle on Piggy-Back

ICC gets question of railroads entering piggy-back service with their own trucks only

THE FIGHT for piggy-back rail service in direct competition with motor truck service has developed into a tug of war between railroaders and truckers. But the Interstate Commerce Commission is calling a halt to the hassle until it can investigate the matter.

Piggy-backing truck trailers on flat railroad cars has spread through the railroad industry like wild fire (see STEEL, June 14, p. 71). Six roads—the Baltimore & Ohio; Delaware, Lackawanna & Western; Erie; Nickel Plate; Pennsylvania and the Wabash—have decided to use their own trucks only and filed tariffs for such service with ICC.

Injured Response—Truckers and four Brooklyn terminals immediately petitioned ICC to suspend the tariffs and prevent such service. On June 15, Division II of ICC issued a six-month suspension. The six roads have asked the full commission to reconsider the question and vacate the Division II order. The railroads contend they need immediate relief because they have gone so far as to order new equipment.

The Pennsy, for example, has given an order to ACF Industries Inc. for 200 75-foot piggy-back cars, which are to be built at ACF's Berwick, Pa., plant. The ICC has scheduled a hearing for June 28.

Open to All — Some railroads such as the New York Central and New York, New Haven & Hartford approach piggy-backing on a contract-open-to-all basis and need to file no tariffs. These roads still have the green light to go ahead with their plans for piggy-back service.

lorthwest Grows Up... Up... Up

	1950	1963	1975
Population, U. S.	151,240,000	183,750,000*	200,000,000*
Population, Pacific Northwest †	4,675,000	6,205,000	7,816,000
Per cent of increase since 1950, U. S.		21.5	32.2
Per cent of increase since 1950, Pacific Northwest †		32.7	67.2

* Estimated by STEEL
† Idaho, Oregon, Washington, plus 11 counties of Montana west of continental divide
Source: Stanford Research Institute

Alcoa

E PACIFIC NORTHWEST, d of Mt. Rainier and salmon heries, is rapidly developing in- a land of a rail lines, power nts and manufacturing facilities. Information included in a re- t study by Kaiser Steel Corp., he West Coast . . . its industrial tential," shows that the north- st states had an increase in nufacturing production work- s from 1939 to 1951 of 96 per nt as against the national aver- e of 60 per cent. Income pay- nts in the area went up 318 r cent from 1929 to 1952 as ainst the national increase of 9 per cent. A few sections of e country showed higher gains one or the other of these two tegories, but only the California- evada-Arizona area showed rger advances on both counts.

Population of the Northwest—regon, Washington, Idaho and e 11 counties of Montana west the continental divide—is ex- cted to increase 67.2 per cent om 4,675,000 in 1950 to 7,816,000 1975, a rate of growth more an double that of the country a whole (see the table).

New Jobs—This increase in population is going to call for 490,000 new jobs by 1963, and 1,075,000 by 1975, according to Carleton reen of Stanford Research Institute. Mr. Green directed a just-oncluded study, "The Impact of ne Aluminum Industry on the Economy of the Pacific Northwest," for Aluminum Co. of America. Alcoa has huge plants in the area.

The industrial growth that already has taken place, Mr. Green says, has added new prospects for still further expansion—broader regional markets from increased population and secondary manufacturing to serve new basic industry.

The Key—Power has been the key to the expansion in the Northwest. And, according to Mr. Green, power is a factor that raises the Northwest above the intense competition for new industry.

The one cloud on an otherwise bright horizon—the absence of firm schedules for the expansion of electric power capacity to meet reasonably expected loads beyond 1958.

H-Bomb Defense: Industry Ducking Its Responsibility?

PLANS TO PROTECT individual plants and get them back into production after an enemy bombing attack can only be made by the plant management involved. Yet most manufacturers have no plans whatever for getting back into production after a possible attack.

That's the current situation as pointed out at a "Businessmen's Conference on Industrial Defense in the Atomic Age," held in Washington and sponsored by the Chamber of Commerce of the U. S.

Half a Loaf—Office of Defense Mobilization Director Arthur S. Flemming said management should not be dismayed over the complex character of the job. "It is desirable," he said, "to have a 100-per-cent plan to meet any disaster. But remember, it is better to have a 20-per-cent plan than no plan at all."

Clem D. Johnston, president of the chamber, said: "Some segments of industry have been ducking their responsibilities in the belief that the H-bomb in Russian hands makes industrial defense a hopeless undertaking." That, he said, is a defeatist attitude and revival of bombed plants is assured in most cases provided adequate planning has been done beforehand.

Underway — The government program for co-operating with industry was outlined by Lt. Gen. W. S. Paul, ODM assistant director for nonmilitary defense and Charles F. Honeywell, head of Business & Defense Services Administration.

Mr. Honeywell reported a special task group of the iron and steel industry has completed a booklet entitled "Industrial Defense Planning Manual," which will be distributed to the industry soon. An aluminum product group is working on a similar manual for its industry. Task groups are also at work in the precision instrument and machine tool industries.

Uncle Sam Tightens Up On Commercial Operations

Plating Change-over Due

Job platers say they're ready and able to do most government plating; U. S. agrees

THE JOB PLATING industry is preparing itself to take over the work of as many government-owned-and-operated plating shops as possible. The civilian plating industry would like to do even federal experimental plating work—on a contract basis.

An estimated 400 to 500 government plating operations can well be taken over by job platers, says the National Association of Metal Finishers. Furthermore, says Raymond M. Shock, NAMF executive secretary, the job plating industry "is more capable of operating experimental plating plants than government employees who have had no practical experience in plating. The plating installations of some of the larger arsenals have cost the government several hundred thousand dollars and could certainly be taken over by our industry on a contract or lease basis."

Ready To Quit — The government says it got into the plating business when it could not find the qualified facilities available for its plating jobs. Now, Howard Gaetz, a representative of Business & Defense Services Administration, has signified the government is ready to work out a program for removal of the U. S. from plating activities.

That's in line with the general government retreat from business ventures which are in direct competition with private industry, such as synthetic rubber production.

The Plan—NAMF plans to appoint committees of members from each section of the country which will accumulate information on all government plating operations in their sections and also information on private facilities in their sections capable of performing government plating work. Finally, NAMF is organizing an industry committee to use this information in working out the change-over of government plating work to civilian shops.

State Taxes Need Overhauling

Multiple taxation, high administrative costs and decreased state revenues are some of the results of "diverse and inconsistent" state net income tax rules for firms in interstate commerce, reports Controllership Foundation Inc., New York.

Greater standardization of rules and definitions might reduce some of the difficulties, the foundation advises in a research report.

Taxpayers would have to agree to a uniform procedure even if somewhat higher taxes resulted. States would have to recognize that a better way to meet budget requirements is by adjusting to tax rates rather than by changing definitions, interpretations and enforcement procedure.

Scrap Stockpile Program Urged

In addition to efforts to get the government out of competition with private business (see following story), scrap interests are urging a national stockpiling program as an aid to pull their industry out of the doldrums.

The National Federation of Independent Scrap Yard Dealers Inc. has filed a brief with the Office of Defense Mobilization requesting a stockpiling program. It suggests a program based upon a formula involving a "floor" or index of steel production.

NFISYD says two-thirds of the scrap collectors and one-third of processing yard workers are unemployed or elsewhere employed.

Scrapmen Win Round One

Senate bill may pull the armed services out of most of their scrap-processing operations

VICTORY is a step closer for the scrap industry in its fight to get the armed services out of the scrap business.

The Defense department's 1955 appropriation bill has been reported to the Senate with an amendment that no funds may be spent for the "operation, acquisition or construction of facilities" for scrap operations unless the Defense secretary determines, with respect to each facility involved, that the operation must be continued in the national interest.

Favorable Odds—Scrap interests feel hopeful that the House will accept the amendment. Interested House committees have opposed scrap processing by the services, and further opposition comes from the Harden subcommittee of the House Government Operations Committee which states that the armed services' claims of cost savings resulting from armed services' scrap operations are unreliable and inaccurate.

In March the services reported 61 scrap processing facilities in operation, of which 17 were being discontinued. Passage of the bill with the amendment will result in the discontinuance of most facilities. Probable exceptions will be those in isolated locations where scrap dealers are not available for handling scrap.

Surplus Disposal Group Formed

Nine top businessmen have been named to a committee that will advise the military departments on the disposal of surplus material. The men, selected for their experience in merchandising, are:

Max F. Balcom, director and consultant, Sylvania Electrical Products Inc., New York; Wheelock H. Bingham, president, R. H. Macy & Co., New York; George F. Chapline, vice president and general manager, Fairchild Engine Division, Fairchild Engine & Airplane Corp., Farmingdale, N. Y.; L. D. Greene (formerly with Bethlehem Steel Co.), Hoover Commission Task Force on Disposal

hington; Carl Kresl (former- with Sears, Roebuck & Co.), ver Commission Task Force Disposal, Washington; Herbert adds, president, Marshall Field Co., Chicago; W. R. Stephens, sident, W. R. Stephens Co., neapolis; John F. Thurston, mpson Products Inc., Cleve- d.

Trade Study Coming

he factor that was responsible stly for the overwhelming vote, -53, by which the House ap- ved the bill to extend the Trade reements Act for one year, was assurance that the Ways & ans Committee has scheduled a rough study of foreign eco- nic policy next year.

The study will be built largely ound the recommendations ich the Randall commission sub- ted to Congress in January of s year. Ways & Means Chair- n Reed said there was no time s year for such a study. As s pointed out by numerous eakers in the floor debate, there wide dissatisfaction with pres- t tariffs on imports on the ound that they are responsible considerable unemployment in me industrial areas; these situa- ns will be reviewed by the com- ttee in 1955.

The bill, when finally passed, ll be retroactive to the expira- n date of June 12.

ines Get a Break

A tax break of close to $5 mil- n will be granted domestic pro- icers of 27 strategic minerals. ne Senate Finance Committee ised depreciation allowances om 15 to 23 per cent to stimulate itput in the U. S. Cut from the t gaining higher depreciation ere lead, zinc, copper and molyb- enum. The 27: Antimony, asbes- s, bauxite, beryllium, bismuth, dmium, celestite (strontium sul- te), cobalt, columbium and tan- lum, corundum (alumina), fluor- ar, graphite, kyanite (aluminum licate), manganese ore, mercury, ica, nickel, platinum metals, ra- io grade quartz crystal, block eatite talc, tin, tungsten, van- dium, thorium, ilmenite and ru- le, zircon, and chromite.

Uncle Sam Loosens Up On Corporate Tax Program

Tax Revisions Closer

The Senate still must approve the tax bill which has been reported out of committee

REPORTED OUT of the Senate Finance Committee, the House-approved tax revision bill now faces what may be a full-scale fight on the Senate floor.

Senate committee Democrats accepted without strong contention the committee decisions which follow the administration's policy of using tax revisions to stimulate business investment. But the Democrats may have been holding back to use the Senate floor for staging their knock-down battle.

Not Final Form — Even after passage by the Senate, joint House-Senate meetings will probably be necessary to iron out wrinkles between the versions of the two houses. So final form of the omnibus tax revision bill will not be known for several weeks yet.

As reported out by the Senate Finance Committee, however, the tax bill would give relief to stockholders to the extent of about 250-million this year and about $850-million annually thereafter. Stockholders will be allowed a $50 exemption plus a 5-per-cent credit on dividend income for the remainder of 1954 and a $100 exemption plus a 10-per-cent credit on dividend income thereafter.

Modified Approval—The Senate committee version approved in general the House bill's declining balance method of taking depreciation on facilities but allowed the more liberal "sum of the digits" method of computing it. Efforts to apply fast tax write-off to secondhand buildings and equipment were turned down.

The committee also approved of the House action to shift the burden of proof to the Internal Revenue Service in cases of hold back of surpluses to avoid taxes. The committee raised the share of surpluses on which penalty taxes should not apply from the House-approved $30,000 to $60,000.

Approved was the pay-as-you-go plan for corporate taxes, though the Senate committee applied the plan to companies with tax liabilities of $100,000 and over rather than $50,000 and over as in the House version.

Navy To Build 20 Tankers

A House Armed Services subcommittee has approved a bill to let the Navy build 20 new tankers at a cost of $150 million.

The bill was recommended as a substitute for a Senate-passed bill (S.3458) under which private industry would build the ships and lease them to the Navy on a long-term basis. The subcommitte decided it would cost less to let the Navy build and own the ships. The ships, however, would be constructed in privately owned yards.

Appointments in Washington

Col. William R. Martin (U. S. Army, ret.) is an industrial consultant to the Israeli metalworking industry on loan from Bureau of Foreign Commerce, Commerce department. He was a metallurgist and production official at American Steel Foundries.

Robert C. Lanphier Jr. is deputy assistant secretary of defense (supply and logistics). He is on leave of absence as a director of Sangamo Electric Co.

Robert E. Simpson was appointed director of the Office of Economic Affairs, Bureau of Foreign Commerce, Department of Commerce. He had been acting director.

Clark M. Wright, Schenectady, N. Y., was named director of Electrical Equipment Division, Business & Defense Services Administration, Department of Commerce. Mr. Wright, marketing manager of General Electric Co.'s Gas Turbine Department, will serve for six months or longer under BDSA's rotation system.

FTC Wants To Know: How Well Does Industry Comply?

NEW DRIVE by the Federal Trade Commission to check compliance with its cease-and-desist orders is not aimed at any industry in particular; this is to be a searching look into all industries.

The FTC wants to know how well industry is complying with its 4500 cease-and-desist orders, as well as other regulatory findings it has made. On most, FTC believes it's getting full compliance. But in about 12 or 15 industries, the FTC has detected a decidedly fishy odor.

Magnifying Glass—For the latter, the FTC plans a thorough investigation, culminating in possible noncompliance proceedings.

Swamped with Old Orders . . .

The job of bringing compliance information up to date is huge. Besides the 4500 cease-and-desist

orders, FTC has issued some 8000 cease-and-desist stipulations and about 160 trade practice rules. Basically, the progress made in checking these old cases will depend in considerable measure on whether the present compliance staff of eight attorneys is increased, and on an increased use for compliance checking purposes of the commission's general investigative staff.

Major part of the compliance check will be done by questionnaires, though that won't be done indiscriminately. "The expense and inconvenience to business and their economic consequences must be weighed in the balance with the public interest," says FTC Chairman Howrey. "We have concluded that the extraordinary investigative powers of the commission should be used only where clearly required to protect the public interest."

So a lot of time-saving shortcuts in the compliance check will cover most cases, with special attention reserved for cases where noncompliance is suggested. In checking compliance with trade practice rules, the commission is expected to call at least some of the industries affected into conference.

Reports Under Oath . . .

Under a rule to become effective when the commission completes revision of its rules of practice, compliance reports will be called for under oath "in appropriate cases." In some cases, the FTC will call for annual reports and in others for nonperiodic special reports.

Again, Chairman Howrey adds, there will be no indiscriminate use of the commission's authority to demand reports. The call for written statements under oath will be relied on particularly to permit perjury prosecutions against small and irresponsible fly-by-night concerns which are nearly "judgment-proof" as far as civil penalties ar concerned.

In another change in the com pliance setup, the commission's at torneys hereafter will advise res pondents when their reports o compliance are satisfactory. Be fore, the commission acknowledge receipt of information with the re servation that "this report is no to be construed as indicating ap proval." Now, in appropriate case such letters will say: "On the basi

of information furnished by you it appears you are presently in compliance."

In its questionnaires, the com mission will set a time limit fo replies. Failure to furnish the de sired information in the time se makes the respondent liable to a fine of $100 a day. Tardy re pondents are already paying such fines.

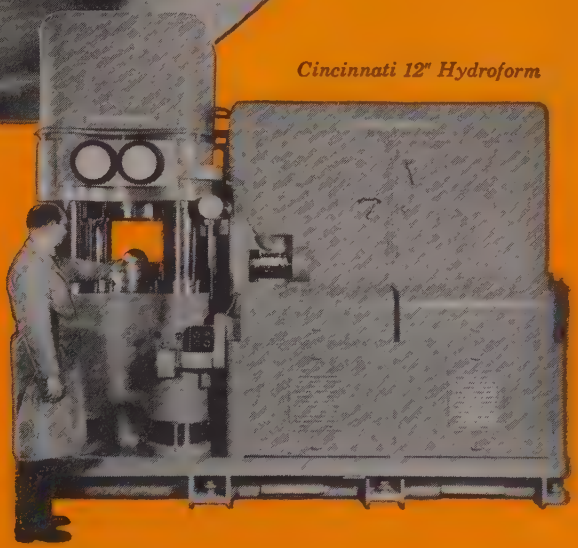
Not As of Old . . .

Nothing from the FTC indicates the present compliance drive is di rected especially at the heavy met al industries. Several importan price-fixing cases are still in proc ess of development so that th question of compliance with them has not yet arisen. These includ the chain and steel barrel cases.

Key orders issued by FTC con cerning heavy metal industries in clude the order of 1924 stopping Pittsburgh plus price quoting, th order of 1951 stopping use of th multiple basing point system an the order of 1944 halting price fix ing in the rigid steel conduit in dustry. But the present attitud of FTC seems to be that there ar no grounds at the present time fo suspecting any noncompliance b the heavy metal group.

60 required...quickly!

Cincinnati 12″ Hydroform



...another job made to order by Hydroforming

By producing the tail light bezel shown above on a Cincinnati 12″ Hydroform, a major automobile manufacturer was able to complete development work and run off the 60 pieces required for model approval at a saving of *six to eight week's time*—and at an 85% *reduction* in tool costs!

Making conventional dies and incorporating subsequent design changes which resulted during the development of this complex part would have made tool costs excessively high. As the Hydroform tools consisted simply of a punch of steel bar stock, and a draw ring contoured to fit around the punch, original tool costs were low and modifications were readily made at minimum cost.

Additional savings resulted as Hydroforming did not impair the excellent finish of the material—.031″ brass. After trimming, only light buffing was required for plating.

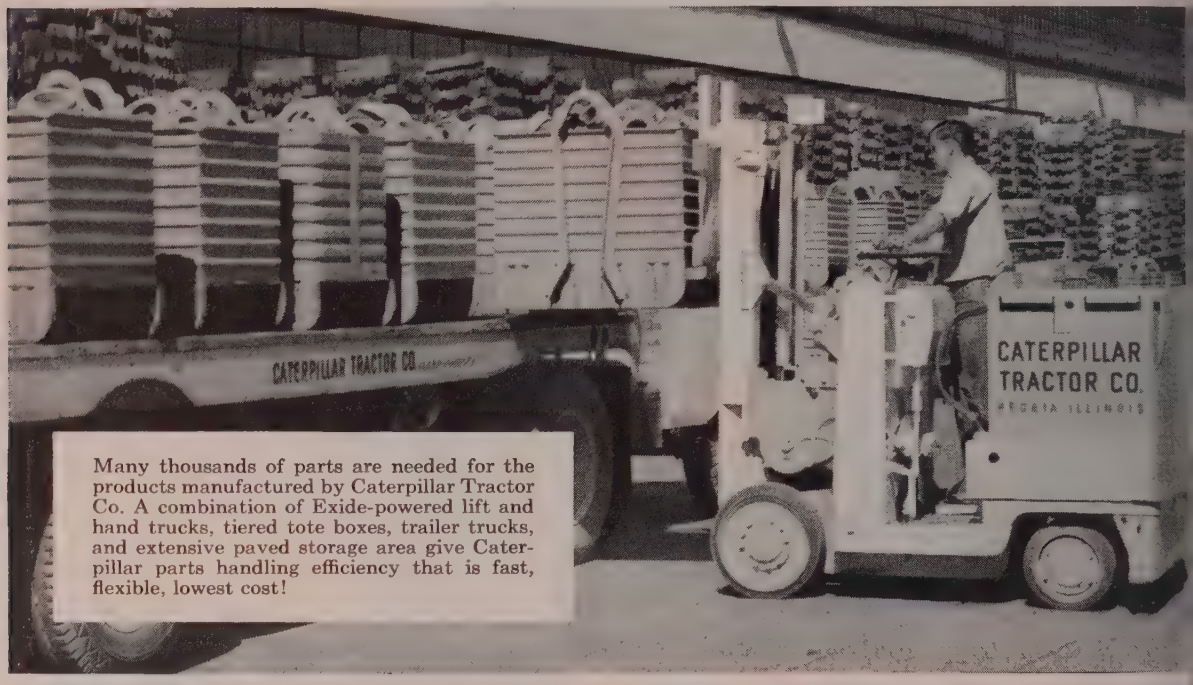
This is another example of the tool and time savings that Hydroforming makes possible . . . for development work . . . for short runs . . . for the production of any simple or complex deep drawn or formed part. Consult your nearest Cincinnati Milling field engineer for complete details on Hydroforming. For a description of the Hydroforming process and specifications of the 8″, 12″, 19″, 23″, 26″ and 32″ machine sizes, write for Bulletin M-1759-2.

CINCINNATI Hydroform

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U.S.A.

GET FAST, SAFE HANDLING THROUGHOUT EACH SHIFT

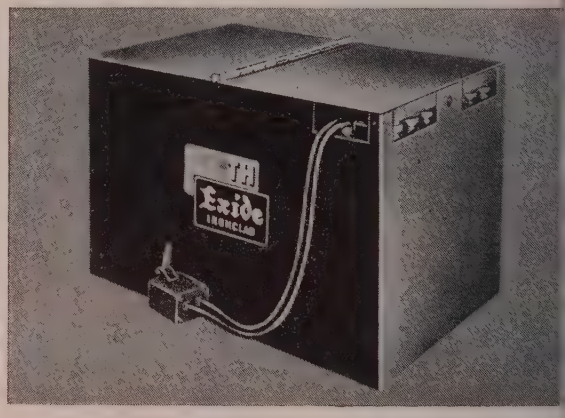
. . . with low cost Exide-Ironclad battery power!



Many thousands of parts are needed for the products manufactured by Caterpillar Tractor Co. A combination of Exide-powered lift and hand trucks, tiered tote boxes, trailer trucks, and extensive paved storage area give Caterpillar parts handling efficiency that is fast, flexible, lowest cost!

YOU GET split-second handling, uniform performance throughout each shift when electric trucks are powered by dependable Exide-Ironclads. Whether the load is light or heavy, Exide-Ironclads deliver power instantly, insuring smooth, rapid handling of materials. Your trucks handle as much pay load during the last hour as during the first . . . with r unscheduled down time. Lower costs for operation, mai tenance and depreciation make Exide-Ironclads your be power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, *giving longer working life.*



THE NEW THRIFTY HAULER! The improved industrial truc battery. *Non-oxidizing* plastic power tubes assure longe battery life, more capacity in the same space. For fu details, call your Exide sales engineer—write for Form 19 (Installation and Maintenance of Motive Power).

Your best power buy
. . . AT ANY PRICE!

Exide
IRONCLAD® BATTERIE

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

ompetition Through Credit Terms

French and German sales reps in Latin America are offering three to five-year credit terms. Preference for American goods offsets that kind of bait only partially

) MEET European competition n Latin America, U. S. industry ill have to start granting long, sy credit terms.

That's the opinion of William nders, of Pfaudler Co., who re- ntly completed a two-month trip uth of the border.

Falling Off — "Letter of credit siness is falling off and will fall ff still more as European compe- ion, notably from France and ermany, increases," Mr. Anders ys. "The reason is obvious. ench and German sales repre- ntatives are all through South nerica soliciting business. And ey extend three to five-year edit terms for American dollars, te unit of exchange in all the ountries."

This lesson of credit terms is be- g learned by some European ountries, too—Belgium, for ex- nple. Hurt by a 27-per-cent op in metalworking exports dur- g 1953, Belgium turned to its ost important metalworking-ex- ort customer, Belgian Congo, to nd out why. Exports to that arket historically represent about 0 per cent of Belgium's total met- lworking export trade.

Three Ingredients—The Belgians ound that their most aggressive ompetitor in the Congo was not ne second-largest-in-dollar-volume upplier, the U. S., nor the third- argest-in-dollar-volume supplier, he U.K. Germany, fourth in ank after Belgium, the U. S. and he U.K. among suppliers to the Congo, was the most active in met- lworking markets. German com- petition was based on three in- gredients: Trade missions; abun- dant and well-written literature; nd, most important, long and easy redit terms.

What were the fields in which he Germans were most active? Automobiles, heavy port-facility equipment, materials handling equipment, machine tools, diesel motors, and small tools.

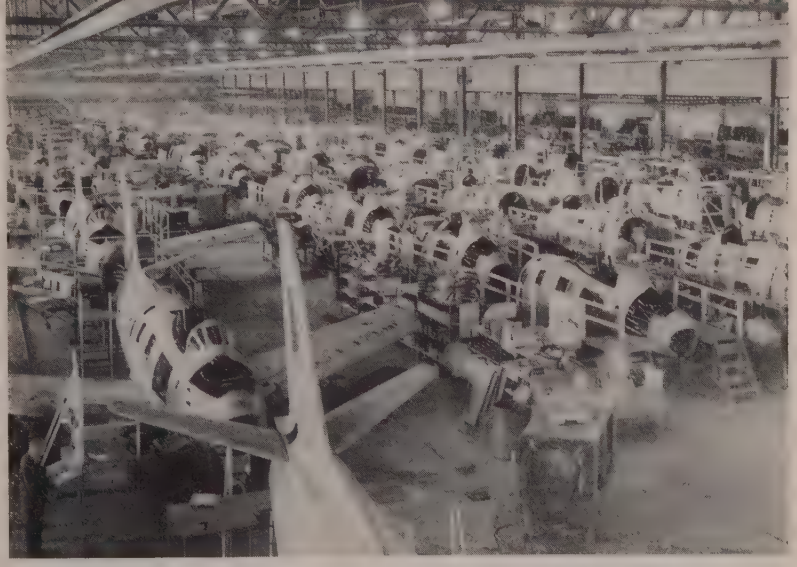
American Preferred — Latin Americans still prefer U. S.-built equipment in many types of heavy equipment, if they can afford it. Experience of U. S. exporters may be varying widely on how much credit extension is necessary to hold the bulk of Latin American trade. Many think it can be done with less than three to five-year credit terms. But, many agree, too, with Pfaudler that some liberalization is needed to meet European competition.

Minerals in Venezuela

Exploration for iron ore and oil in Venezuela has uncovered a bonus result in the location of other mineral deposits. Mining concessions granted by the Venezuelan government up to the end of 1952 cover: Lead and copper —5436 acres; gold and diamonds —113,174 acres; manganese—16,- 062 acres; coal—6499 acres; gypsum—1285 acres; asbestos—3879 acres; nickel—9934 acres; and iron ore—140,603 acres. Yet these, the Venezuelan government says, merely scratch the surface of the mineral wealth of that country.

Foreign Business Notes

Incoming orders for German capital goods exports have jumped 30 per cent in first quarter, 1954, over the same period last year . . . Chancellor of the British Exchequer Butler says British industrial output in early 1954 was 7.5 per cent ahead of last year: Auto output was up 42 per cent; tractor output was up 21 per cent; and steel output was up 4 per cent. Exports of those products are also ahead of last year . . . Frederick M. Hammond, president and treasurer, Gemmer Mfg. Co., Detroit, predicts production of trucks in Brazil will reach nearly 120,000 units per year by 1965 while car output will reach about 70,000 units yearly by the same time. Present production of trucks is about 4000 units and automobiles 9000 units . . . During the first quarter, French industrial output reached a record-high level.



Canadian Planemaker Celebrates Its 1000th Sabre

Canadair Ltd. of Montreal's final assembly line shown above produced its 1000th F-86 Sabre in May, 1954. Canadair, part of the General Dynamics Corp., Groton, Conn., group, also produces T-33 Silver Star jet trainers (a version of the T-33 Lockheed Shooting Star but with a Rolls Royce Nene engine). Canadair's Mark IV Sabres are powered by the Avro all-Canadian-built Orenda engines. U.S. planemaker, Consolidated Vultee Aircraft Corp., is also a GDC subsidiary

Electronics and atomic energy major fields for new products a

Aircraft Makers Diversify Into New Lines:

Nonaircraft Sales Are Long-Term Insuranc

MANY major aircraft manufacturers are counting on diversification into nonaircraft products to take up any future slack in military plane orders. Diversification is of growing interest to the planemakers' 60,000 suppliers and subcontractors, too. They will have to key their plans to this new trend.

Nonaircraft activities of the major producers center mainly in the electronics or atomic energy fields, with a few companies marketing commercial goods. Only a handful of major firms still concentrate 100 per cent on aircraft.

One of the First—North American Aviation Inc., Los Angeles, one of the first to diversify its product line, has been working with the Atomic Energy Commission since 1946 on full-time atomic projects. NAA's nuclear studies for the AEC have involved more than $10 million to date.

Atomic energy accomplishments at North American include design, construction and operation of a water-boiler type reactor producing neutrons for research and development work for all types of reactors. North American spokesmen anticipate a modest future market for small atomic power plants for special purposes or high-cost locations.

Following the Trend—Following the diversification trend, Boeing Airplane Co., Seattle, established an industrial products division at its Seattle plant to manage and manufacture nonaircraft products. These include gas turbine engines, electronic computers, and power-line suspension clamps. In 1952, the company's sales of industrial products approached the $8-million mark.

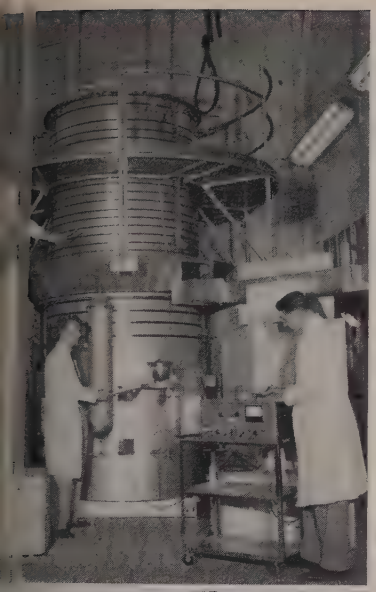
While most of Boeing's turbine engines have been made for military use, an experimental engine was installed in a Kenworth truck which carried 68,000-pound loads through more than 5000 miles of mountainous country. As for its computers, Boeing uses them in its research laboratories as well as selling them commercially. Boeing expects the clamps, made of aluminum, to become standard equipment in high voltage transmission.

Deep in Electronics — Another major aircraft company including nonaircraft work in its manufacturing operations is Glenn L. Martin Co., Baltimore. In the electronics field, Martin is working on radar; autopilot and navigation systems; and telemeterin antenna and microwave device Martin's main interest is in deve oping equipment for integrat electronic systems.

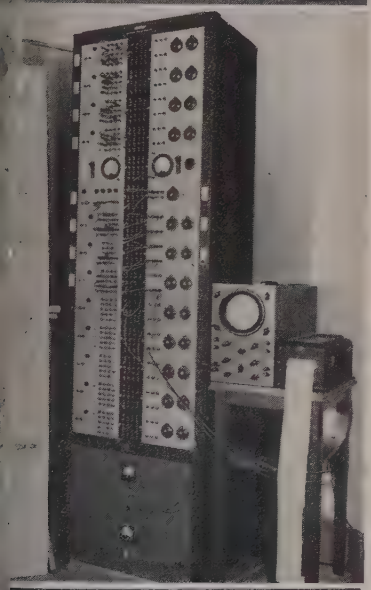
Douglas Aircraft Co. Inc., L Angeles, entered a new market r cently with the manufacture ar sale of Aircomb honeycomb pa els. Aircomb is a resin-impre nated kraft-paper honeycomb tha sandwiches between metal, woo or plastic facings. A piece steel of equal rigidity would weig 16 times more and aluminu would weigh 10 times more tha the Douglas panels, say compan officials.

Commercially Minded — Deve oped in 1946 for use in constru tion of guided missiles, wing cargo containers, pallets, floor and ceilings, Aircomb panels wi be sold by Douglas in bulk lots t nonaviation industries. A 65,00 square-foot plant has been buil and more than 100 workers ar employed on the project. Curren production exceeds 500,000 boar feet per month.

Of all major aircraft companies Northrop Aircraft Inc., Haw thorne, Calif., has strayed farthes afield from strictly aeronautica operations. Northrop erected



From NORTH AMERICAN—Atomic Energy



From BOEING—Electronic Computers

From NORTHOP—Optical Equipment

plant at Anaheim, Calif., for manufacture of precision optical instruments and is currently the largest western supplier of such instruments.

Close to Airfield — While those and other major planemakers are rapidly branching into other manufacturing activities, some large firms still concentrate exclusively on aircraft. Consolidated Vultee Aircraft Corp., San Diego, Calif., actually discourages diversification, preferring to maintain a secure position in aircraft manufacture. Convair's current business is 90-per-cent military and 10-per-cent commercial, though the company says it would welcome a reversal of that ratio.

Lockheed Aircraft Corp., Burbank, Calif., is another major company devoted exclusively to aircraft production. The firm has engaged in research which produced commercial products—Lockfoam and safety vests, for example. But Lockheed does not produce those items directly, rather assigns them outright to specialized companies.

McDonnell Aircraft Corp., St. Louis, is engaged 100 per cent with aircraft defense contracts, and Republic Aviation Corp., New York, also has no nonaircraft production currently scheduled.

Light of Foot — Firms selling aircraft components to aircraft manufacturers are displaying no concern over the trend toward diversification. Operating on a job basis, these fabricators are light on their feet and can easily adjust production to new items. Ryan Aeronautical Co., San Diego, Calif., long-time producer of ball-and-socket joints for Boeing B-50 bombers is an example. With Boeing's diversification, Ryan is now producing socket joints, of aircraft design, for use in the exhaust system of the new Boeing gas turbine-powered truck.

Steel-Concrete Roof Beats Fire

Successful tests have been made on a steel-concrete roof designed to prevent the spread of fire in industrial buildings.

Roof was developed by Granco Steel Products Co., subsidiary of Granite City Steel Co., and Perlite Institute of New York. Granco provides a heavy-duty corrugated sheet steel, Tufcor, for the roof base, and Perlite produces a lightweight, insulating concrete which is placed upon the steel.

Temperatures inside the test building which was 25 feet long and 10 feet wide reached 1720 degrees fahrenheit, but the rooftop temperature stayed at about 200 degrees. In a load test following the fire test, a load of 270 pounds per square foot was applied before the roof failed.

Improved River Channel Urged

Private industry's expansion plans in the Delaware River region have interested the Corps of Engineers to the tune of $92,385,000. That's the estimated cost of improvements recommended to Congress by the Chief of Engineers.

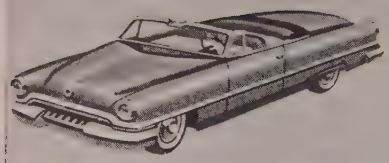
Col. Benjamin B. Talley told the national convention of American Society of Civil Engineers that the Chief of Engineers' report recommends in effect that the present 40-foot channel ending at Philadelphia be extended upstream to Newbold Island (Morrisville, Pa.) with a width of 400 feet, then upstream to Trenton with a depth of 35 feet and a width of 300 feet.

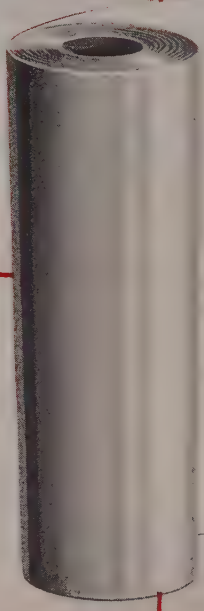
Colonel Talley is division engineer, North Atlantic Division, N. Y.

Magnetic Clutch by Eaton

Reported recently is a new magnetic clutch developed by Eaton Mfg. Co. Improving on the original version which used magnetic particles in a fluid carrier subject to heat deterioration, the new clutch uses dry magnetic powder which can run virtually red hot without deterioration.

In addition to its automotive uses, conveyor equipment, punch presses and machine tools also offer fields of possibility for the device.





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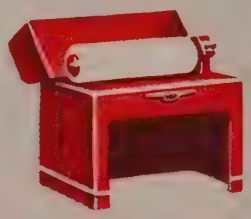
Autos, appliances, transportation or farm equipment . . . if your products require flat-rolled steel, they deserve the best. And it's our obligation to see that you get the very best that 25 years' specialization in flat-rolled steel can provide.



GREAT LAKES STEEL CORPORATION

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Sales offices in New York, Chicago, Cleveland, Grand Rapids, Indianapolis, Lansing, Philadelphia.

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NEA

"Dealers' welfare may cost us $50 million this year."

Studebaker's Paul Hoffman Seeks Answer for Independents' Ills

DETROIT

THINGS have reached a point in the auto industry where an independent may best be defined as a company with the "now or never" outlook of an unmarried secretary in her thirties. Now in its 102nd year, Studebaker perhaps has not quit looking, but it's fairly well gotten used to the idea of living alone.

Stylish Studebaker—One of the advantages of living alone is the ability to do as you see fit. And somewhat over a year ago, Studebaker saw fit to introduce one of the most unusual style jobs in quite some time. Auto stylists in Detroit privately viewed the Studebaker as an object of uninhibited sculptural beauty and went back to their chrome and bread boxes secretly wishing it success. Perhaps, they hoped, sincerity of form will replace the suggestion of rocket ships.

As you probably remember, the portent was good. Studebaker received a rash of publicity that had many a competitor green with dream cars. People flocked to the sales rooms, but only to see photographs. The car had been introduced before die and other production troubles had been licked. That lag in production, Studebaker Board Chairman Paul G. Hoffman feels, did much to prevent the company from striking while the iron was first hot. Then Borg-Warner struck when the iron began to get hot again.

Economic Eclipse — Finally, in the last half of 1953 when Studebaker began to fill orders in earnest, the production race began and Studebaker was faced with the discounting of cars by its competitors. Many a Studebaker dealer found his hot prospects lured away by a "would you take?" under the windshield wiper. With volume for the year already crippled, the dealers were unable to underwrite fire sales and finished up the year with hopes that 1954 would be brighter.

Thus far 1954 has been a repeat of the last half of 1953. Already loaded with 1953 models when the year started, competitors lost no time in turnover trading and bootlegging. Studebaker dealers, already somewhat on the ropes, had no choice but to try to sell their product on its merits. And to a public already made immune to merit by injudicious use of shouted superlatives, the Studebaker was a car which might be "different", but which also cost more than some of the others.

Dealer Demand—That does much to explain why Studebaker sales are less than half what they were a year ago. For Studebaker has adopted a policy of producing only to dealer order to avoid weakening its distribution setup and views the production race as wanton experience that cannot fail to have dire repercussions over the long pull. "The consideration of the welfare of our dealers may cost us $50 million this year," says Paul Hoffman, "But that figure is small compared with the cost of rebuilding a dealer organization wiped-out by blitz selling."

Another problem Studebaker faces is the need for revamping its labor clauses. Much like Kaiser-Willys in Toledo, Studebaker is

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still saddled with piece rates which permit men to go home at one o'clock in the afternoon in many parts of the plant. It has spent upward of $100,000 in a single week in bumping pay. Union men, many of whom were brought in during the lush postwar days, are now beginning to realize that passing gravy labor costs on to the consumer is resulting in fewer car sales and less work for everyone. With the Kaiser-Willys contract revisions, Studebaker is hopeful that similar realistic adjustments can be made to help make its labor bill more in line with other companies in the industry.

Styling Success?—Certainly the general situation at Studebaker clouds any pat answer to the question STEEL asked Paul Hoffman: Has the Studebaker styling venture been a success?

"If we had it all to do over," says Mr. Hoffman, "we probably would have changed our introduction date and put a little more chrome on our cars. Perhaps our sedans are not quite so appealing stylewise as our coupe models. But we built the kind of car we felt the American people should want. Now our job is educating them to our product."

Typical Talk—That typifies the talk you hear at Studebaker. The designers and engineers have an unshaken faith in the functional beauty of their cars. They are genuinely misty-eyed at the evident rejection of their effort by the American public, the car many voted most likely to succeed.

NE

"We built the kind of car we felt people should want."

What would they have changed? Maybe the trunk should have been bigger, they muse. Perhaps the cars should have been larger and had more horsepower. But the sweeping victories of the cars in the Mobilgas Economy Run bear testimony to success in giving more transportation per fuel dollar. The engineers will be making changes in the direction of their musings, but somehow there's the feeling they're putting a sequin gown on their Mona Lisa.

Another Airflow?—Some find it easy to write off the Studebaker as another Chrysler Airflow, soundly designed but unforgiveably ahead of its time. Others point to the contradiction in the car, sprightly looks and stolid performance. But above all there is the belief that Studebakers compromise the utility of a family truck to appear more like an automobile.

Perhaps Studebaker is reaping the inevitable penalty for its audacity in telling the people what they want rather than asking them. Perhaps the design has just been caught in a series of circumstances in which a less appealing mode design would have fared eve worse. These are possibilities dif ficult to evaluate in a busines where evaluation is survival.

Hazardous Help—But the Stu debaker people are rolling up thei sleeves. Early this year worker voluntarily signed pledges to main tain the Studebaker tradition o quality in their work, though sig natures were not asked by th company. The insistence of a smal group of workers that their bud dies drive Studebakers resulted i such violence that the compan was forced to take steps to correc the situation when the reports wer misinterpreted to mean that th firm was requiring all its worker to buy its products.

"We'll put our quality up agains any car in the industry," says Pau Hoffman, and it's indicative of th growing revival of the craftsma spirit at South Bend.

The present Studebaker men mus look back with awe, however, no only on the craftsmanship of th early wagon-building Studebaker but upon the first contract draw by Peter and Clem Studebaker i 1863. It read:

"I agree to sell all the wagon my brother Clem can make. Signed Peter Studebaker.

"I agree to make all he can sel Signed, Clem Studebaker.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,154†	684,843
June		713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,274

Week Ended	1954	1953
May 15	153,796	177,805
May 22	157,993	162,447
May 29	148,774	125,868
June 5	119,688	134,879
June 12	140,404	167,095
June 19	139,000*	169,031

Source: Ward's Automotive Reports.
*Estimated by STEEL.

DIE CAST OF ZINC

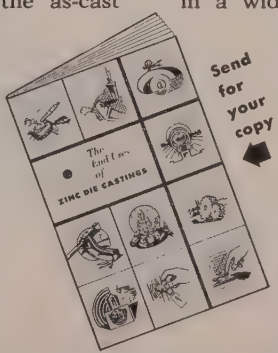
for PHILCO

Here's Why . . . .

Die casting is the only economically feasible means of production for this Philco TV receiver screen frame. And ZINC was the logical choice of metal to obtain the required physical characteristics at the lowest cost. The casting is shown here *as delivered to Philco* with the as-cast surfaces handsomely finished in two-tone durable enamel.

This front view of the ZINC Die Cast frame reveals the unusual contours, the engraved lettering and serrated decorative treatment, and the cored openings in the recessed control panel at the base—all obtained in the high speed casting operation! A rear view of the casting would reveal ingenious coring to insure maximum strength with a minimum amount of metal, plus cast bosses to facilitate assembly of the frame to the cabinet.

Add to the foregoing the dimensional accuracy of ZINC Die Castings and you have the principal reasons for the ever-increasing use of this metal and method of production. For many more examples of successful ZINC Die Casting applications in a wide range of products ask us—or any die casting company—for our booklet "The End Uses of the Zinc Die Castings".



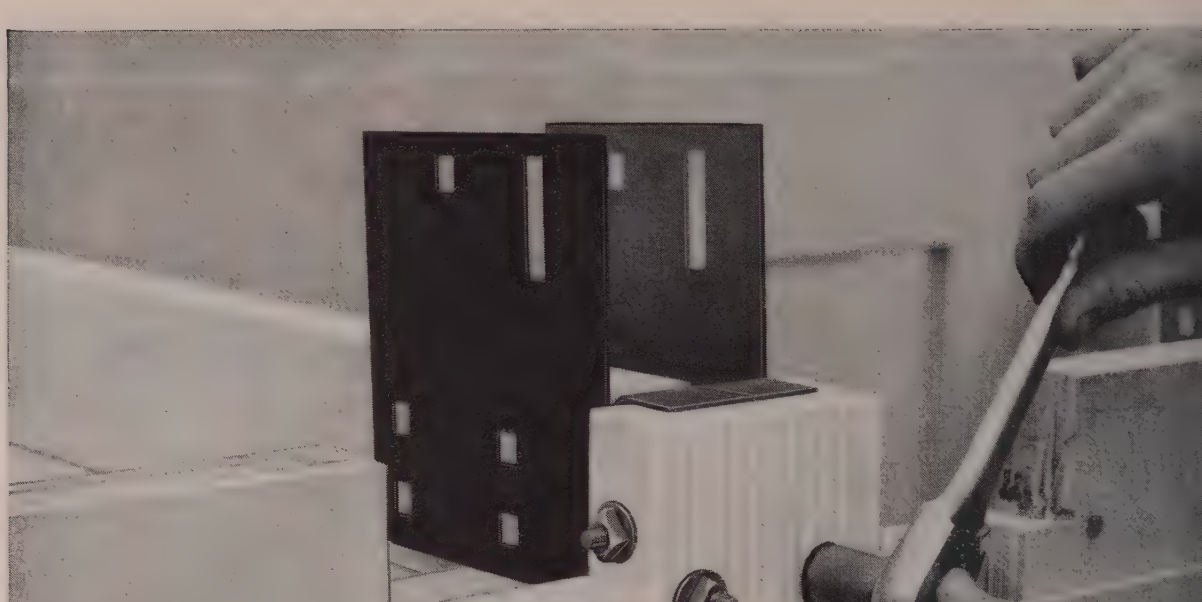
Send for your copy

The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC



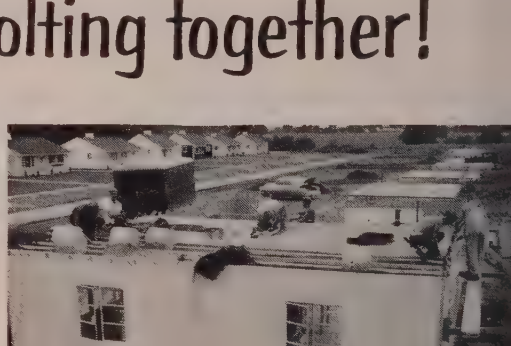
RAISING THE ROOF of a U.S. Steel home goes faster with help of RB&W bolts. Here workman is tightening bolt holding steel plate to exterior wall panel. Plate is then used as joint for bolting ceiling panels.

That's a house he's bolting together!

U.S. Steel Homes found that bolting together the panels of their fast-selling homes saves time and trouble. Nails are used only to hold panels temporarily in position for bolting and add no structural strength.

It's no accident, of course, that RB&W bolts and nuts were specified here. U.S. Steel Homes isn't the first to discover that the absolute uniformity and dependable holding power of RB&W products make them the best fasteners for any job. Workmen like the way RB&W nuts run on RB&W bolts fast and easy. And there's no question about the extra strength RB&W bolt-and-nut construction gives these homes.

Whenever you want to put something together *fast*, and make it stay fastened *for good*, give one of our men a ring. As a top-ranking maker of all kinds of fasteners, we're always able to recommend and supply the right ones for all your needs. You can count on fast delivery, too. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N.Y.



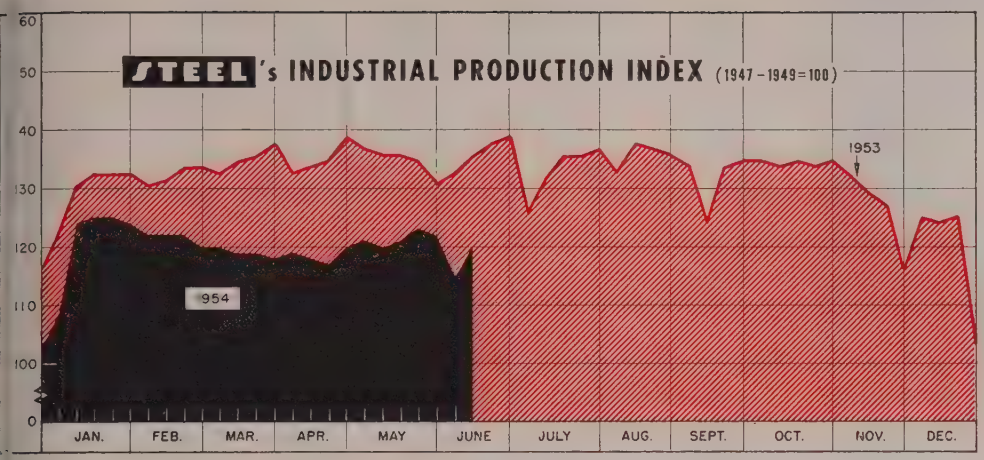
HOUSE GOING UP. U.S. Steel home nears completion a workmen on scaffold (right) bolt on exterior panels. Thes sturdy homes offer quality construction at budget price

3.

RB&W

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA. PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*



LATEST WEEK*	120
PREVIOUS WEEK	115
MONTH AGO	119
YEAR AGO	136

*Week ended June 12.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Construction Sparks Industrial Activity

WHILE MOST INDUSTRY wonders when and how much of a definite business recovery will come, construction men wonder how long they can soar at record levels before the kite string breaks or slacks off. But the outlook for the industry now is for fair weather for flying throughout the year, and nobody is complaining.

This industry, which is bettering an already important role as a consumer of steel products, set a new record for May of $3.1 billion in new construction and another record of $13.2 billion for the first five months of the year, according to a joint report of the Commerce and Labor departments. Thus, 1954 is the fifth year in a row in which the total for the first five months has exceeded the previous year's figures for the same period. Because of this unprecedented activity, the two departments have revised their estimates of total construction for 1954 upward to a record $36 billion. This would be a 2-per-cent increase from 1953's record instead of the 2-per-cent decrease originally forecast last November.

As measured by *Engineering News-Record,* May not only was better than May, 1953, and April, 1954, but it also was the biggest month for contract volume since January, 1953. June seems to be following the pattern inasmuch as ENR reports heavy construction contracts for the full week ended June 10 were more than half again as much as for the vacation-shortened week of June 3.

Nice Make-up—The composition of these totals is of special interest, especially when contrasted with previous high marks. Government spending and heavy industrial expansion were largely responsible for the previous records. Because much of the latter was directly connected with defense needs, it could be said that

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,740	1,674	1,690
Electric Power Distributed (million kwhr)	8,270[1]	8,246	8,245
Bitum. Coal Output (daily av.—1000 tons)	1,077	1,183	1,502
Petroleum Production (daily av.—1000 bbls)	6,480[1]	6,466	6,477
Construction Volume (ENR—millions)	$325.5	$204.4	$368.7
Automobile, Truck Output (Ward's—units)	140,404	119,688	166,832
TRADE			
Freight Car Loadings (unit—1000 cars)	650[1]	612	797
Business Failures (Dun & Bradstreet, no.)	225[1]	218	167
Currency in Circulation (millions)[3]	$29,873	$29,934	$30,003
Dept. Store Sales (changes from year ago)[3]	−13%	+8%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,375	$16,338	$17,667
Federal Gross Debt (billions)	$273.3	$273.5	$267.3
Bond Volume, NYSE (millions)	$16.1	$12.6	$16.6
Stocks Sales, NYSE (thousands of shares)	9,640	7,321	7,285
Loans and Investments (billions)[4]	$80.5	$80.5	$76.0
U. S. Gov't. Obligations Held (billions)[4]	$33.2	$33.0	$29.1
PRICES			
STEEL's Finished Steel Price Index[5]	189.75	189.75	182.82
STEEL's Nonferrous Metal Price Index[6]	215.0	214.5	224.7
All Commodities[7]	110.5	110.7	109.6
Commodities Other Than Farm & Foods[7]	114.4	114.5	113.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

33 years ago they told me:

"YOU HAVE LESS THAN A YEAR TO LIVE!"

"MUST HAVE BEEN back in 1919 or '20. Hopeless case of diabetes. No known cure . . .

"BUT HERE I AM. They found a treatment—insulin—in time. Today, *nobody* has to die of diabetes.

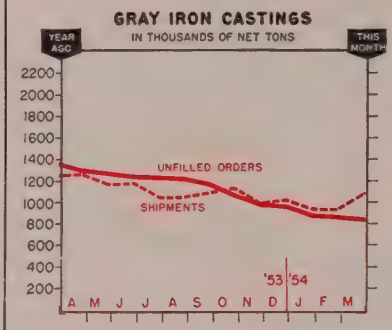
"CANCER, I know, is a tougher problem. But the laboratories can lick that one, too—with our support. Already, they're curing people who would have been done for a few years ago. Last year—thanks to $5,000,000 allocated by the American Cancer Society from our contributions—they found out a lot more . . . though there's still a long way to go.

"THEY NEED MONEY, though. $5,000,000 is still less than 4 cents per American *per year*. Not enough. Not enough to find the answer *fast* enough—230,000 Americans are going to die of cancer *this year*, they say.

"I'M NOT RICH, but I gave 'em $50 last year—hope to do better this time. After all, where would *I* be if the laboratories working on diabetes, that time, hadn't been given enough support—?"

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give

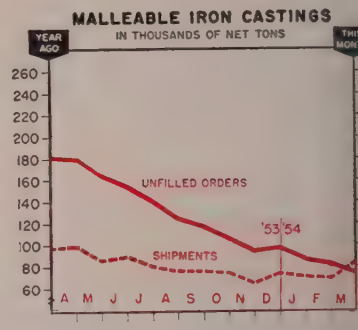
AMERICAN CANCER SOCIETY
GENTLEMEN:
☐ Please send me free information on cancer.
☐ Enclosed is my contribution of $..... to the cancer crusade.
Name.....
Address.....
City.....State.....
Simply address the envelope: CANCER c/o Postmaster, Name of Your Town



Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	932	1,162	872	1,333
Feb.	936	1,136	865	1,332
Mar.	1,084	1,264	842	1,376
Apr.	...	1,277	...	1,306
May	...	1,186	...	1,272
June	...	1,196	...	1,246
July	...	1,056	...	1,233
Aug.	...	1,069	...	1,223
Sept.	...	1,106	...	1,170
Oct.	...	1,142	...	1,076
Nov.	...	1,004	...	977
Dec.	...	1,032	...	955
Total	...	13,630		

*For sale, U. S. Bureau of the Census.
Charts Copyright 1954 STEEL.



Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	70.3	87.2	85.6	174.8
Feb.	69.1	86.5	81.6	175.1
Mar.	84.0	94.5	74.0	177.8
Apr.	...	95.9	...	174.5
May	...	82.1	...	160.4
June	...	86.5	...	151.0
July	...	77.1	...	137.3
Aug.	...	73.9	...	120.8
Sept.	...	74.3	...	114.5
Oct.	...	73.5	...	104.0
Nov.	...	63.4	...	93.2
Dec.	...	72.1	...	95.6
Total	...	966.9		

*For sale, U. S. Bureau of the Census.

the construction industry owed those records to the government. Not so today. ENR reports federal awards are off 30 per cent so far this year compared with 1953, but the surge in roadbuilding, school construction and private building have more than offset the deficit. This is a true return to the civilian economy.

Not so encouraging is the fact that cost of construction is continuing its upward climb. *Engineering News-Record* reports higher wage contracts in eight cities have pushed up the publication's cost index by .06 per cent to 622.49, based on 1913 = 100. That is 4.8 per cent higher than a year ago. The climb in the index so far this year has been steeper than in the same period of 1953. Cost of building materials has remained firm. The over-all rise in cost is not expected to slow down the rate of construction, however.

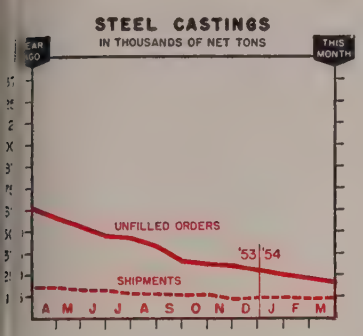
Steel Operations Inch Upward

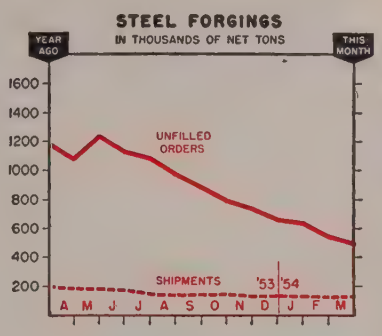
There still is not much to shout about in the over-all picture, as evidenced by STEEL's industrial production index. The latest week has been pegged tentatively at 120 per cent of the 1947-1949 level, up 5 points from the holiday-depressed revised reading 115 for the week ended June 5. A components of industry making this index helped the revitaliz tion, with steel production and au output leading the way. Actu steel operations for the week b ginning June 7 were 73.2 per ce of capacity, says American Iron Steel Institute, and a rise to 73 per cent was predicted for t week ended June 20. That wou make the sixth successive we of operations above the 70-pe cent mark.

Summer Dip Ahead for Autos

Automakers seem to be tape ing off their production schedul earlier this year than last, a cording to *Ward's Automotive R ports*. June production is sche uled at a daily rate 7.7 per ce below that of May, and July w see production stretched out ev farther.

Net effect will be a June-Jul August volume about 12 per ce below the March-April-May v ume, *Ward's* says. The dip 1953 was only 1 per cent. T reason probably is high inve tories at the dealer level, althou that situation saw its first bre in six months as the result of i





	Thousands of Net Tons Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	122.8	167.2	251.8	706.5
Feb.	116.5	175.7	234.6	644.3
Mar.	122.0	182.2	214.0	634.6
Apr.	....	179.6	....	573.6
May	....	165.6	....	525.0
June	....	164.7	....	475.8
July	....	139.6	....	467.9
Aug.	....	141.3	....	418.9
Sept.	....	135.3	....	327.2
Oct.	....	140.7	....	313.7
Nov.	....	114.1	....	308.5
Dec.	....	123.3	....	278.4
Total	....	1,829.3		

*For sale. U. S. Bureau of the Census.

	Thousands of Net Tons* Shipments		Unfilled Orders	
	1954	1953	1954	1953
Jan.	139	184	638	1,207
Feb.	127	184	539	1,199
Mar.	130	200	489	1,197
Apr.	....	196	....	1,082
May	....	191	....	1,239
June	....	185	....	1,135
July	....	155	....	1,081
Aug.	....	151	....	974
Sept.	....	153	....	882
Oct.	....	156	....	798
Nov.	....	143	....	740
Dec.	....	143	....	651

U. S. Bureau of the Census. *Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

eased selling in the latter part May. Dealers had been exted to sell 490,000 units last onth, but they pulled a surprise th 505,000 units.

ood Things To Come . . .

Both the appliance and electical energy industries heard good ews when J. H. Jewell, president National Electrical Manufacrers Association, told the group at sales of electrical apparatus id supplies should total $14 bilon in the next five years, an crease of 28 per cent over the ast five years. He said more than 28 million new appliances will ove into American homes in that eriod, including 101 million maor appliances, 248 million portable ems, 47 million radio receivers id 32 million TV sets. Air conditioning will have an important role this increase. All forms of air onditioning and refrigeration conumed only 8.9 billion kilowatthours of electricity in 1950. Mr. ewell predicts the total will reach 5.4 billion in 1963.

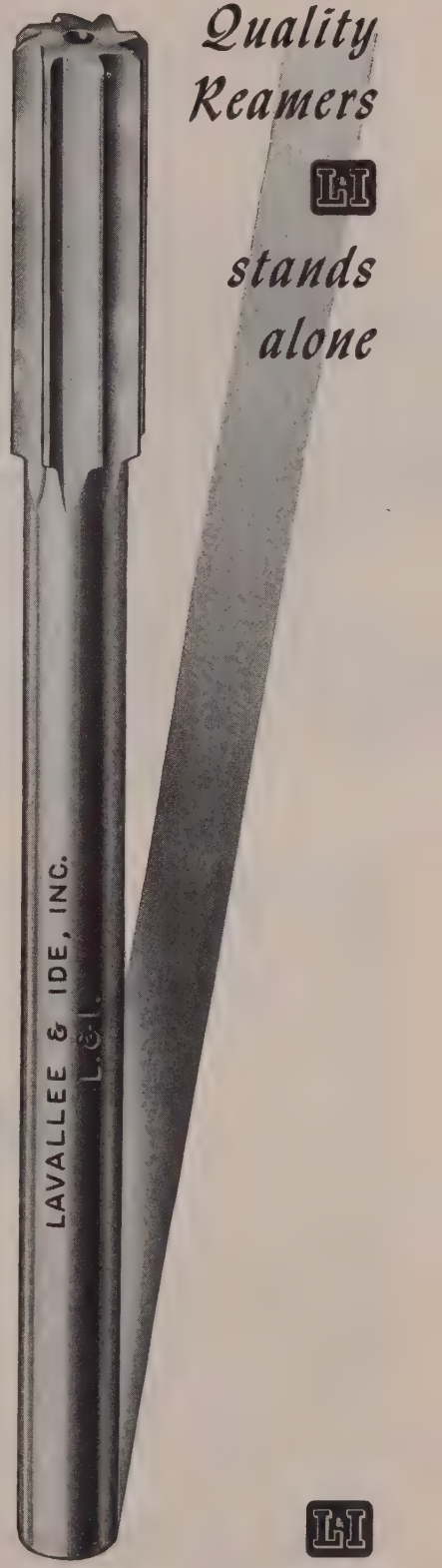
R. E. Cassatt, Fedders-Quigan orp., Buffalo, fortified that prediction when he told National Association of Electrical Distributors that this year about 1.5 million air-conditioning units will be sold for about $525 million and by 1960 the unit total should reach well over 4 million yearly at the least.

Inventory Report . . .

In the May survey of the Purchasing Agents Association of Chicago, almost three-fourths of the agents replying believe their inventories are in satisfactory balance in anticipation of future demands. Less than a third believe their inventories are still too high, but less than 2 per cent believe they are too low. It still looks like the new-order situation will be hand-to-mouth for some time.

How Much Is "Plus?" . . .

More on appliances—Robert Galvin, executive vice president of Motorola Inc., says most of the problems of color television are being solved and by fall the industry will have a 19-inch set retailing for $1000-plus. He believes about 1 million color sets will be produced in 1955 along with 4.5 million black and white sets.



for Quality Reamers

L&I

stands alone

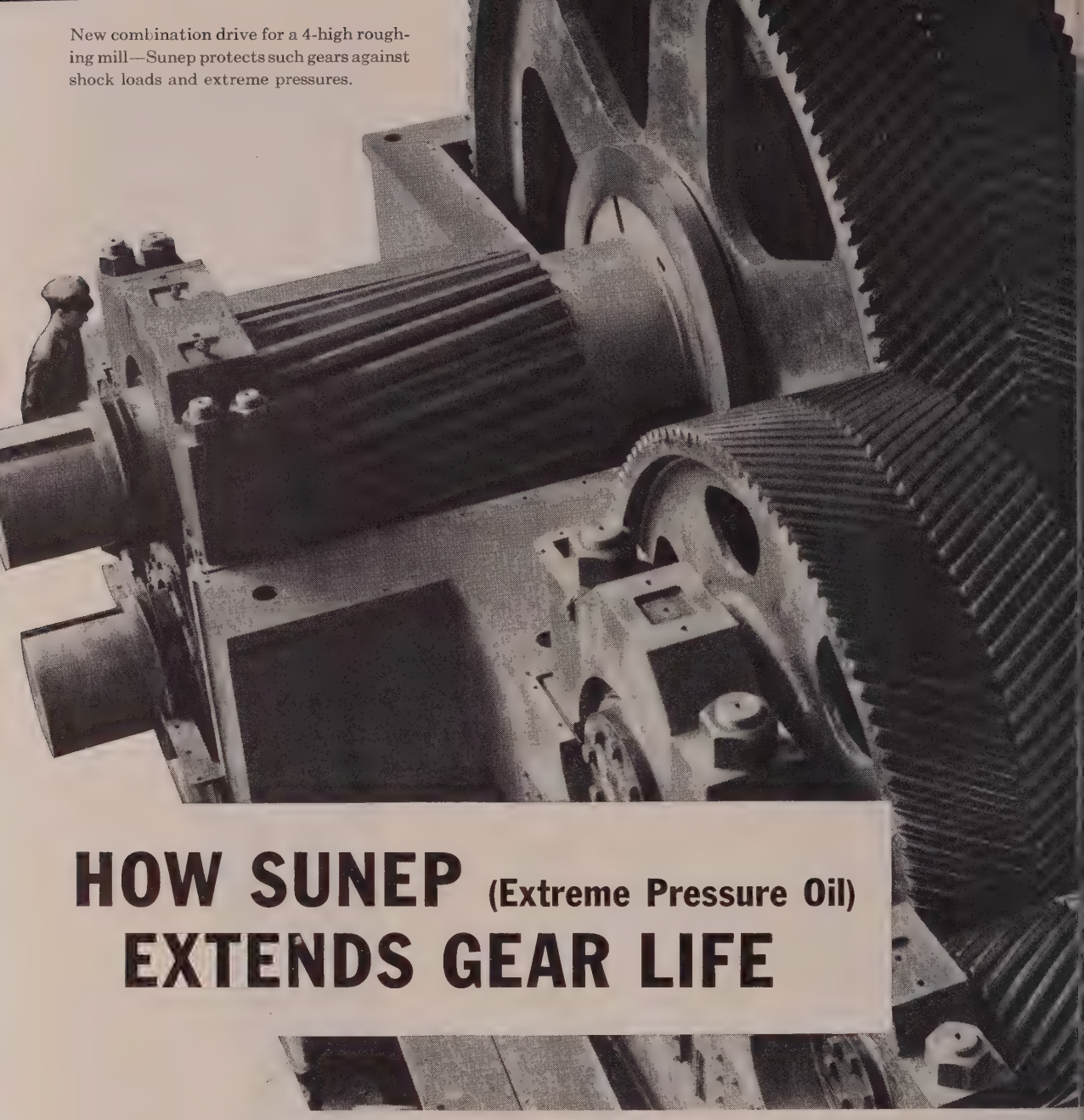
L&I

The Reamer Specialists

LAVALLEE & IDE, INC.

CHICOPEE, MASS.

New combination drive for a 4-high roughing mill—Sunep protects such gears against shock loads and extreme pressures.



HOW SUNEP (Extreme Pressure Oil) EXTENDS GEAR LIFE

The advantage of running your machines at high speeds and under heavy loads can be quickly lost if your extreme pressure lubricants turn thick, lose film strength, or cause gears to corrode.

Sunep gives your gears better protection longer. Unlike many E.P. oils, Sunep is made from highly refined, premium grade oils skillfully blended with chemical additives that do not drop out during operation or in prolonged storage. This accounts for several rare user benefits: long life at extreme pressures; absence of corrosion—even on bronze; rust protection for steel parts; clean gears and bearings as a result of the oil's high stability.

Primarily a lubricant for enclosed gears, Sunep has proven to be highly effective on bearings and screws working under extreme pressures. Because of its exceptional clinging characteristics, Sunep guards against metal-to-metal contact during the early moments of machine operation after shutdown. FREE BULLETIN. Tells all about Sunep. Get your copy. Write Dept. S-6.

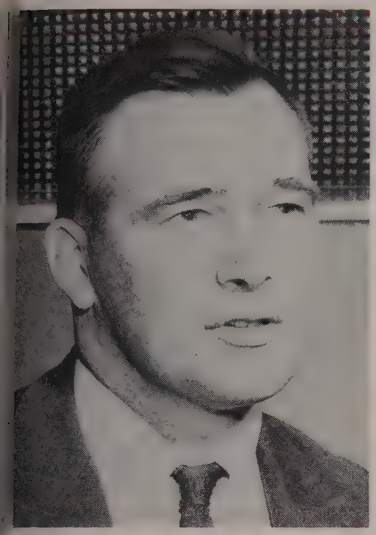
INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of famous High-Test Blue Sunoco Gasoline



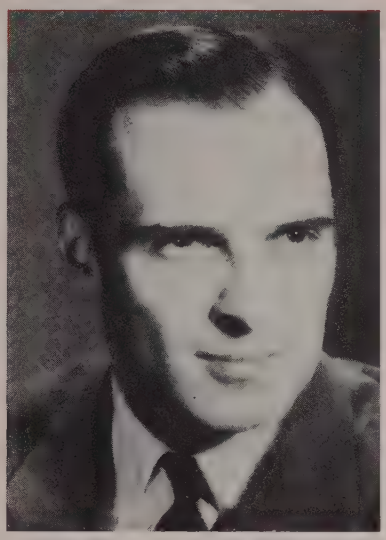
JOHN P. MOORHOUSE
. . . SPS director of purchases

John P. Moorhouse was assigned duties of director of purchases under his present title of purchasing agent at **Standard Pressed Steel Co.**, Jenkintown, Pa. He is in charge of receiving, raw materials purchasing and stores and the buying of machinery in addition to his regular duties. **Edwin Y. Bready,** who held the title of director of purchases, was named division manager earlier this year of SPS's Hallowell Pressed Steel Division.

R. A. Carlson was elected vice president and manager of engineering for **Rockford Clutch Division** of Borg-Warner Corp. at Rockford, Ill., where he previously served as chief engineer and sales engineer. **E. R. Williams** was made sales manager and **F. C. Fager** assistant sales manager. **E. C. Shields,** vice president - general sales manager, has retired.

Nolan E. McDonald joins **Magnesium Co. of America,** East Chicago, Ind., to head its new impact extrusion department. He was technical assistant to the chief engineer at Reynolds Metals Co.

C. J. Tuckley, former sales manager, was appointed director of sales at **Guibert Steel Co.,** Pittsburgh. **David B. Hughes** was made sales manager and **Joseph Stevens** was placed in charge of design as chief designer. **H. E. McMinn** continues as chief engineer.



PHILIP H. EMRICH
. . . Vickers' Joplin, Mo., plant mgr.

Philip H. Emrich was made manager of the Joplin, Mo., manufacturing plant of **Vickers Inc.** Formerly product service department manager for Vickers, he is succeeded by **Gregory M. McKeown. George C. Bonnell** was made assistant head of that department. **Gordon Elliott,** who supervised plant construction and initial production at the Joplin plant, returns to his former capacity as manager of Vickers' expanded manufacturing plant at Omaha, Nebr.

J. A. Kummerer was appointed director of purchases for **Pullman-Standard Car Mfg. Co.,** Chicago. He succeeds **Frank B. Baker,** who retired as vice president, purchasing June 1. Mr. Baker was named assistant to the president.

Semon H. Stupakoff, former president of Stupakoff Ceramic & Mfg. Co., Latrobe, Pa., which was acquired by **Carborundum Co.,** Niagara Falls, N. Y., as a division early this year, was elected Carborundum vice president. He continues to direct the activities of the division.

Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., appointed **Stanley W. Lovejoy** to the position of manager, cutting tool research. He formerly served General Electric Co. as tool supervisor of its West Lynn Works and a consultant on cutting tool design and application.

ROSSER L. WILSON
. . . Brake Shoe engineering v. p.

Brake Shoe & Castings Division, American Brake Shoe Co., New York, appointed **Rosser L. Wilson** vice president in charge of engineering and **Robert B. Pogue** consulting engineer. Mr. Wilson formerly served as chief engineer of the division.

Robert F. Lay was promoted to assistant general sales manager, **Cooper-Bessemer Corp.,** Mt. Vernon, O., and **Eugene L. Miller** to assistant general manager. Mr. Lay formerly served as chief engineer, product division, and Mr. Miller was supervisor of application engineering.

Robert W. Kerr was made divisional vice president of **American Machine & Foundry Co.'s** general products group. Before joining the company in January as deputy group executive, he was president of Bingham-Herbrand Corp.

Harry S. Brenner was appointed director of engineering for **Olympic Screw & Rivet Corp.,** Downey, Calif. He has been standard engineer in charge of fastener development with the U. S. Navy Department's Bureau of Aeronautics.

John W. Mason was made Detroit district manager of **Allen-Bradley Co.** to succeed **J. D. Petersen,** retired.

Marston Ames was elected presi-

dent of **W. Ames & Co.**, Jersey City, N. J. He succeeds **J. W. Ames**, named chairman.

Frank Fraser was named administrative vice president of **Clevite-Brush Development Co.**, Cleveland.

L. L. Reed is general manager of the Albion, Mich., and Somerville, Mass., plants recently acquired by **Colson Corp.**, Elyria, O., from Service Caster & Truck Corp.

John Lukas is now plant superintendent at the Rochester, N. Y., plant of **Follansbee Metals**, a division of Follansbee Steel Corp.

Paul Turner, former chief industrial engineer, was named works manager of **American Kitchens Division**, Avco Corp., Connersville, Ind. He replaces **Frank Hibbeln**, appointed works manager of New Idea Division.

Maxwell D. Millard was appointed director, distribution and availability, **United States Steel Corp.**, Pittsburgh. He has been assistant general sales manager, American Steel & Wire Division, Cleveland.

J. F. Hutchinson was made assistant general manager of **Goodyear Tire & Rubber Co.'s** metal products division, Akron.

Elmer P. Behrens was appointed director of purchases, **Royal Metal Mfg. Co., Chicago.** He held a similar position with Brunswick-Balke-Collender Co.

Frank J. Hirner was made district manager of excavator sales for the Chicago-Milwaukee offices of **Harnischfeger Corp.** He has headquarters in Chicago.

Richard M. Wille was made assistant manager, sheet metal products sales division, **Inland Steel Products Co.**, Milwaukee. He formerly was assistant manager of the company's Cleveland branch offices and warehouse.

George C. Davis Jr. was made manager of a new technical sales department of **Kaiser Chemicals Division**, Kaiser Aluminum & Chemical Corp., Oakland, Calif.

David H. Brown was made director of engineering and research of **New Process Gear Corp.**, Syracuse, N.Y.

PAUL C. ELY
. . . supt. of National Tube's Gary plant

Paul C. Ely succeeds the late **Paul F. Mumma** as general superintendent of the Gary, Ind., plant of **National Tube Division**, U. S. Steel Corp. Associated with National Tube for 27 years, Mr. Ely in 1952 was made division superintendent of its Lorain, O., Works in charge of all steelmaking.

John E. Smet was made New England manager by **Allis-Chalmers Mfg. Co.'s** machinery division.

Atkins Saw Division, Indianapolis, Borg-Warner Corp., appointed **B. L. Owens** sales manager and **M. A. Bauer** assistant sales manager. Mr. Owens, connected with Atkins for 32 years, was formerly director of marketing. Mr. Bauer served as manager, contract department

Wirt Farley transfers to **Vapor Heating Corp.'s** main office in Chicago as assistant to the vice president of sales, in charge of all non-railroad sales. Formerly district manager on the West Coast, his successor is **Lou A. Richardson**, formerly Washington, D. C., district manager.

Robert H. Binkerd was made district manager of a new Pittsburgh sales office of **American Locomotive Co.**

Mallory-Sharon Titanium Corp., Niles, O., in expanding its service engineering group, placed **Andrew N. Eshman** in charge of engineering service to customers relative to fabrication, metallurgy and processing of titanium sheet and **L. M. Gary** in development and improvement of forging and fabricating technique.

Howard C. Filbert was elected vice president, **Miller Metal Products Inc.**, Baltimore. He is in charge of engineering research.

Hollywood Mfg. & Supply Corp., Los Angeles, manufacturer of aircraft, automotive and electronics parts, appointed **Ralph C. Chrissie** sales manager.

Roy F. Hancock was made assistant vice president of **Vanadium Corp. of America**, New York. **F. F. Franklin** was promoted to assist-

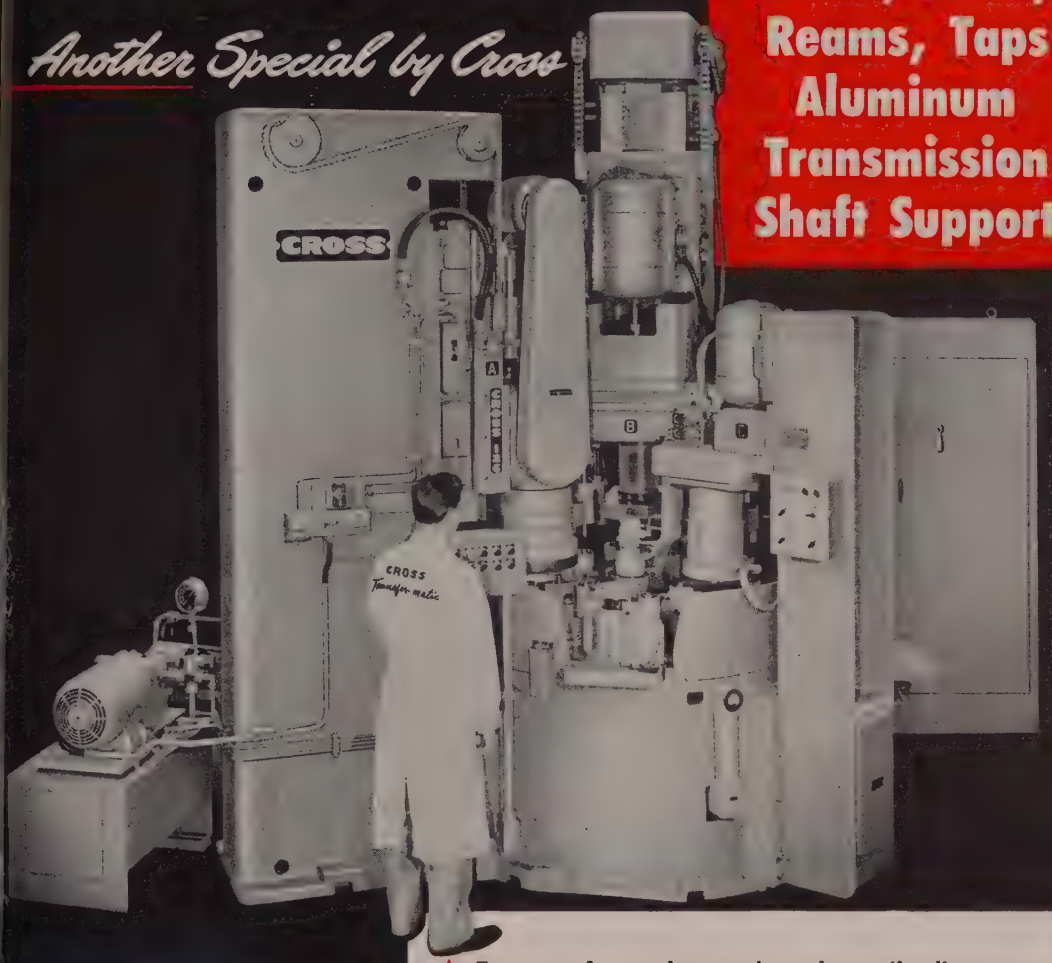
B. L. OWENS

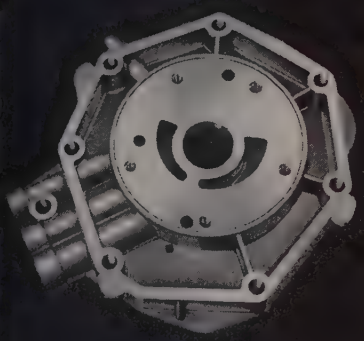
M. A. BAUER

. . . new appointments at Atkins Saw Division

Another Special by Cross

Bores, Drills, Reams, Taps Aluminum Transmission Shaft Support





- ★ Turns rear face and counterbores large pilot diameter, drills 6 holes, drills and reams 2 locating holes, chamfers and taps 5 holes.
- ★ 128 aluminum castings per hour at 100% efficiency.
- ★ 6 station fluid motor driven index table with 1 loading and 5 working stations.
- ★ Hydraulic power clamping for work holding fixtures.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Hydraulic feed and rapid traverse; hardened and ground ways; filtered coolant system; construction to J.I.C. standards; automatic work cycle.

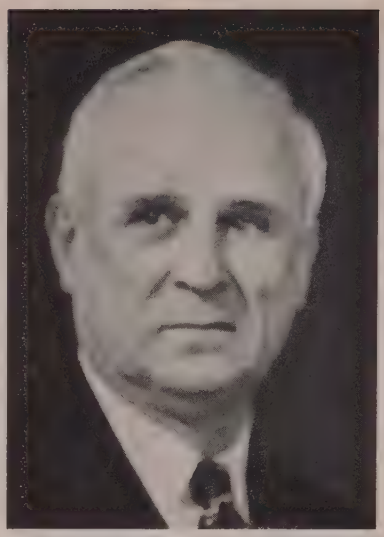
Established 1898

THE **CROSS** CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

CARROLL L. WILSON
. . . Metals & Controls v. p.



HARVEY W. BALL
. . . tech. adviser at Morgan Engineering

GEORGE E. MILLER
. . . div. sales mgr. at Federal Foundry

ant district manager, Cleveland district office.

Carroll L. Wilson, director of industrial development of Climax Molybdenum Co. and former general manager of the Atomic Energy Commission, was elected vice president and general manager of **Metals & Controls Corp.,** Attleboro, Mass., on whose board he has served for the last three years.

John W. Larson, former chief engineer of the Convair Division of General Dynamics Corp., Ft. Worth, Tex., joined **Chance Vought Aircraft Inc.,** Dallas, as staff assistant to the chief engineer.

W. M. Edward was made manager of manufacturing engineering and **D. W. Zimmerman** assistant manager at **Ford Motor Co.'s** aircraft engine division at Chicago. **E. M. Sirhal** was made manager of plant engineering.

Robert S. Price was made general manager of **Seiberling Rubber Co.'s** plastics division, Akron.

Harvey W. Ball was named technical adviser to the president of **Morgan Engineering Co.,** Alliance, O. He is responsible in a staff capacity for work of an advisory nature directly related to engineering, design and other technical details of the company's products. **Charles F. Simmers,** former chief mill engineer, was made assistant director of engineering to succeed Mr. Ball.

Walter F. Donaldson Jr. was made assistant district sales manager in **Jones & Laughlin Steel Corp.'s** New York office.

Harry A. Donahue Jr. was made sales manager, aviation division, **Marion Electrical Instrument Co.,** Manchester, N. H.

Robert E. DePatie was made production and procurement manager of **Industrial Sound Control Inc.,** Hartford, Conn.

Robert F. Fox, district engineer for **Eutectic Welding Alloys Corp.,** Flushing, N. Y., was promoted to district manager.

George E. Miller, former sales manager of Osborn Mfg. Co., was appointed sales manager, machine division, **Federal Foundry Supply Co.,** Cleveland. He will promote sales of Federal's new San-Blo molder blower recently introduced at the AFS Foundry Show in Cleveland as well as the company's line of San-Blo core blowers and other foundry machines.

Franklin F. Bogardus, former Cleveland district manager, moves to a similar position in the Chicago office of **Roots-Connersville Blower Division** of Dresser Industries Inc. He is replaced at Cleveland by **Richard L. Tannehill.**

George A. Grossman was appointed assistant sales manager of **Barth Corp.,** Cleveland, manufacturer of tools, dies and special machinery.

Clarence Harding was made general manager of **Ircal Industries** Los Angeles subsidiary of International Resistance Co.

OBITUARIES . . .

Burton R. Root, 41, supervisor of the small tool department of **Niles-Bement-Pond Co.,** Hartford, Conn., died June 3.

Theodore M. Hiester, 77, who organized **United Aircraft Products Co.,** Dayton, O., and served as president, died May 27.

Clarence W. Hamilton, 62, public relations director and administrative staff member at **Sheffield Corp.,** Dayton, O., died June 7.

Arthur H. Hemker, 47, manager of farm, trade and services industries sales for **General Electric Co.,** Schenectady, N. Y., died May 22.

Walter M. Doranski, 53, general superintendent of **General Motors Corp.'s** Electro-Motive Division plant in La Grange, Ill., died June 6.

William E. Anderson, 66, treasurer **J. I. Case Mfg. Co.,** Racine, Wis. died June 9.

W. S. Nyerges, 53, general manager, Bellevue, O., lamp works of **General Electric Co.,** died June

Machine selection in doubt? Here's a practical way out

Kearney & Trecker's

TOOL-LEASE

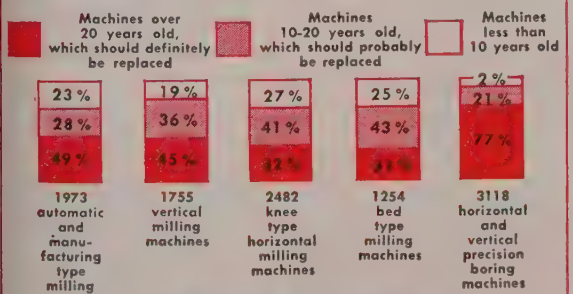
PROGRAM

allows you to rent new machine tools...

literally try them before you buy them...to be sure you get the flexibility you need to meet changing competitive conditions

HERE'S WHAT THE OBSOLESCENCE PICTURE LOOKS LIKE IN THE MOTOR VEHICLES AND PARTS INDUSTRY

Here's the picture in a typical basic industry—MOTOR VEHICLES AND PARTS — (see chart below). Of the 10921 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — *which could be replaced by Tool-Lease* equipment — 33% are 10-20 years old, 18% are more than 20 years old!



TOOL LEASE
KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS
EQUIPMENT ®

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TOOL-LEASE — A COMMON-SENSE APPROACH TO PLANT MODERNIZATION

Kearney & Trecker's Tool-Lease Program offers operating management a way to stop the trend of rising costs, increasing competition and shrinking profit margins. With Tool-Lease, you can enjoy optimum flexibility to meet changing production requirements while avoiding the risk of high obsolescence. What's more, Tool-Lease provides a way to keep your plant modern without tying up working capital.

TOOL-LEASE OFFERS A CHOICE OF PLANS TO MEET INDIVIDUAL NEEDS

Under Tool-Lease, you can rent any of the standard Kearney & Trecker knee or bed type milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

GET ALL THE FACTS NOW

For complete information on Tool-Lease . . . help in analyzing your milling and/or precision boring needs—see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

Kearney & Trecker Corporation
6784 W. National Ave., Milwaukee 14, Wis.

Please send me Bulletin TL-10A with details on the Tool-Lease Program or call Milwaukee, GReenfield 6-8300.

Name.....

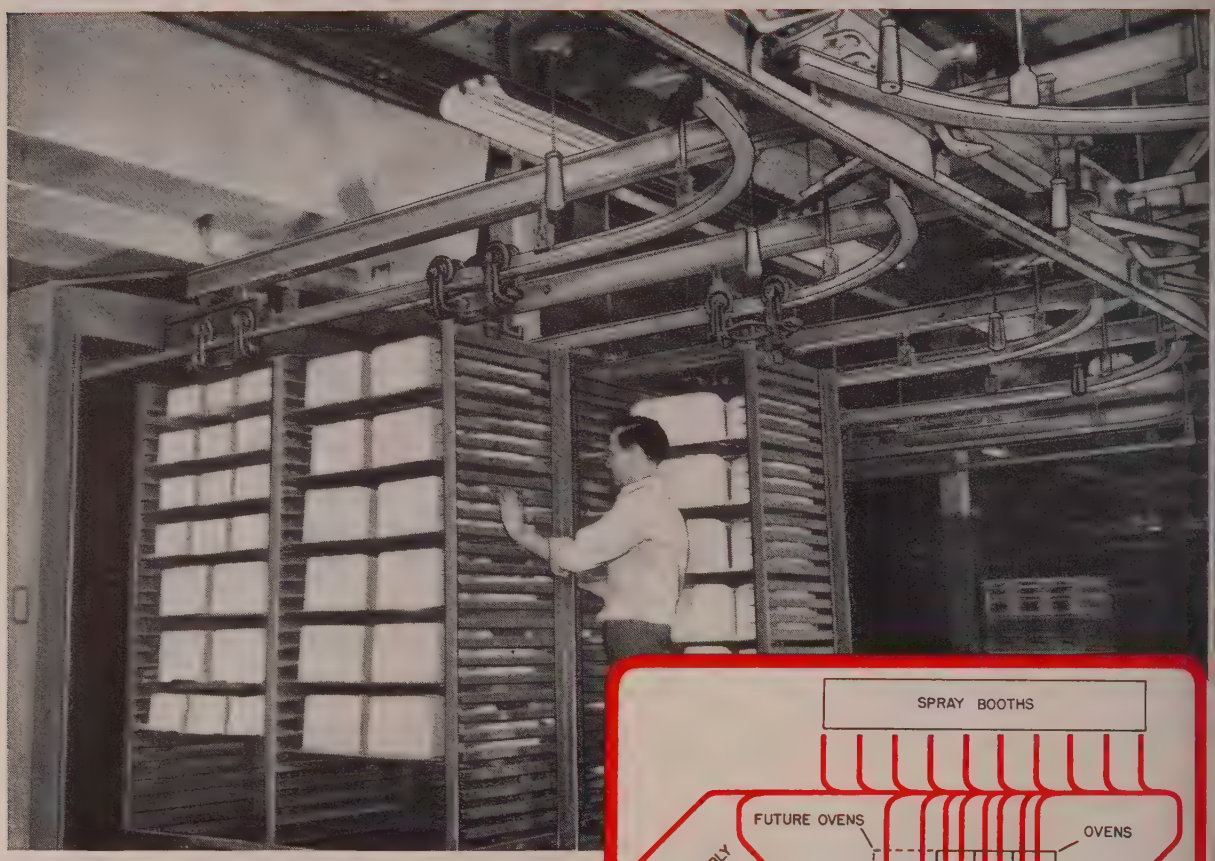
Title.....

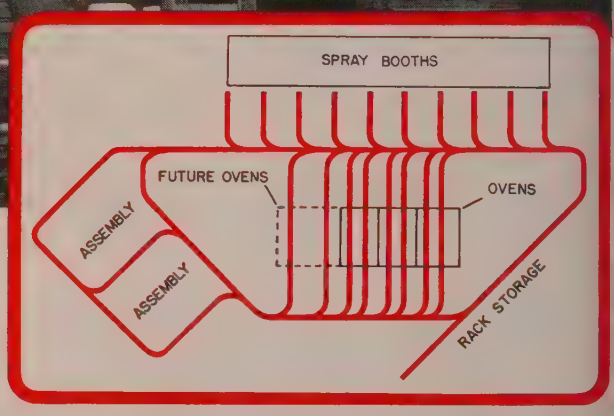
Company.....

Address.....

City.....Zone.....State.....

Handling a broad range of shapes and sizes?





Louden engineered systems have the answer for that too!

The installation shown above is one of the answers Louden *engineered* overhead handling systems have for all handling problems. Here, a big enameling and japanning plant finishes everything from small parts to desks and cabinets. Louden monorail and man-powered conveyor racks handle work from dipping vats into baking furnaces on into storage. No unloading. No rehandling. No delays. No floor maintenance. Manpower and handling costs are cut, operations are accelerated.

You will find the lowest-cost, most efficient, most economical solution to your handling problems when you take advantage of Louden's long experience and competent engineering advice.

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MONORAIL & CRANES

Since 1867—the first name in materials handling

Alcoa Unites Divisions

Organizes all foundry operations into enlarged Castings Division under A. B. Norton

TWO major operating divisions of Aluminum Co. of America—the Die Castings Division and the Castings Division—have been consolidated. This follows retirement of G. M. Rollason, general manager of the Die Castings Division.

A. B. Norton, who has been general manager of Alcoa's Castings Division, is now also directing die casting operations. H. C. Erskine, who was assistant general manager of the Die Castings Division, is assistant general manager of the enlarged Castings Division.

One Operating Division — With these moves, all of Alcoa's foundry operations are organized into a single operating division. Previously, the Pittsburgh firm's two die casting works comprised the Die Castings Division while the five foundries in which the sand, permanent mold and plaster casting processes are employed, were a part of the Castings Division.

The merger will allow Alcoa to achieve operating economies and better co-ordination of production activities.

Alcoa's Castings Division now includes the die casting plants at Garwood, N. J., and Chicago, as well as aluminum and magnesium foundries and other operations at Cleveland, Detroit, Bridgeport, Conn., Vernon, Calif., and Buffalo.

Parker Rust-Proof Expands

Parker Rust-Proof Co., Detroit, is expanding its facilities in Maywood, Calif. The project includes a 20-per-cent increase in manufacturing capacity.

Machinery Firm Opens Plant

Hartford Special Machinery Co., Hartford, Conn., opened its 44,000-sq-ft plant in Simsbury, Conn. This is the first step in a plan to move ultimately the company's entire operation to Simsbury. Fabrication of parts and the main offices will continue for the present at the Hartford location. In addition to its general contract machine work, the firm makes single purpose automatic drilling and tapping machines, Super-spacers and automatic thread rollers.

Distributors Build Warehouse

Foucar, Ray & Simon, steel distributors, are spending $500,000 for a new warehouse on Townsend street, near Third street, San Francisco. The building will have two-fifths more floor space than present quarters and will be occupied in September.

Sanford-Day Buys Brown-Fayro

Assets of Brown-Fayro Co., operating structural steel and mine equipment plants in Johnstown, Pa., were purchased by Sanford-Day Iron Works, Knoxville, Tenn.

Federal Mfg. To Move

City of New York has taken title to Federal Mfg. & Engineering Corp.'s main plant at Steuben street and Emerson place, Brooklyn, N. Y., to make way for a housing and college development program approved by Washington. Federal will continue operating at the plant indefinitely while seeking a new manufacturing site covering about 100,000 sq ft. The company makes electronic, radio and test equipment; tape recorders; photographic equipment and accessories. The company also has inaugurated a division to make transit cases used in the shipment of defense materiel.

Harris Pump Opens Warehouse

Harris Pump & Supply Co., Pittsburgh, opened a warehouse in that city. The firm specializes in industrial equipment for mills, mines and the chemical industry.

Timken Expands Bucyrus Plant

Timken Roller Bearing Co., Canton, O., plans to install six furnaces, costing $360,000, and auxiliary equipment in its Bucyrus, O., plant. These furnaces, scheduled for installation by Surface Combustion Corp., Toledo, O., by Dec. 1, will carburize, harden and temper bearing parts at a capacity rate of 4300 pieces an hour. The furnaces

(*Please turn to page* 104)

Industrial "Organist" Inspects Turbine Casing

At the "console" of what looks like an industrial organ is a worker inspecting bolting studs in the lower half of a casing which will house a powerful propulsion turbine to be installed on *U. S. S. Saratoga*, one of three super aircraft carriers being built for the Navy. The turbine is being manufactured by General Electric Co., Schenectady, N. Y., at its medium steam turbine plant in Lynn, Mass. A propulsion unit for the *Saratoga* consists of a high and intermediate turbine, a low pressure turbine, and a reduction gear unit. The casing shown above will house a high pressure-intermediate pressure turbine

The Big Trend in Metalworking...

MOVE the metal ...it's cheaper than

HOW NEW METHODS SAVE BIG SUMS

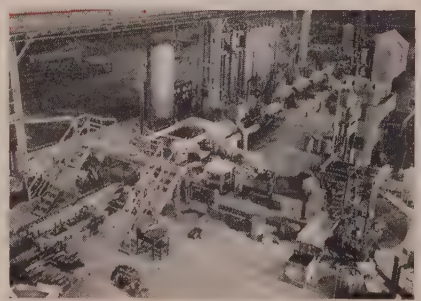
A. Parts are produced primarily by forcing metal into the desired shape rather than by "removing" or "machining" it. It is far faster . . . saves tremendously in time and labor.

B. The amount of metal in the initial slug, shot, billet, sheet, etc., is only slightly more than the total amount in the finished piece. Thus scrap and machining are held to an absolute minimum.

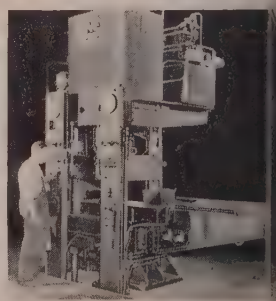
Metalworking plants castin about for ways to reduce production cos are turning more and more to the new methods of forging, drawing and extrudin in which metal is being "pushed around rather than "removed." These processes basic ally are the hot extrusion of alloy steel, co "pressure" forging of aluminum, cold extru sion of steel, and high pressure closed d extruding of aluminum and other non-fe rous alloys. Also falling within this categor

Closed die extruding of heated aluminum reduced production time 99%.

Cold steel extrusion reduced scrap 43%.



Hot alloy steel extrusion is now an established art.



Metal powder parts are often produced with no machining.

- *New and improved production techniques save millions... arouse widespread interest*

1. Actual parts production is cut from hours in typical cases to minutes or even seconds.
2. Pieces generally have superior finish and improved physicals including grain structure.
3. Tolerances and uniformity equal or better those of older methods.
4. Scrap is greatly reduced and in many cases practically eliminated.
5. Unit costs go way down.

REMOVING it!

re somewhat older though greatly changed nd improved methods for the extrusion of luminum, hot forging of ferrous metals, pow- ler metallurgy, deep drawing of sheet and lie casting. The most recent developments nvolve variations and combinations of the bove applied to many products and mate- ials. Our engineers are in close daily contact with these developments. They'll be glad to help apply any of them to your production. Call or write us.

LAKE ERIE HYDRAULIC PRESSES

LAKE ERIE ENGINEERING CORP.

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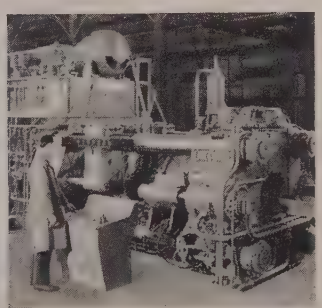
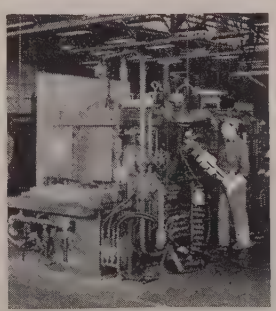
HYDRAULIC PRESSES • DIE CASTING MACHINES
ROLLING MILL AUXILIARY EQUIPMENT

New developments in steel orging have greatly expanded its application.



Non-ferrous extrusion installations now embrace titanium, magnesium and newer metals.



Production rates of die cast aluminum and zinc parts have been upped 20% to 30%.

PACKAGED INSTALLATIONS

A new service by Lake Erie which enables you to order an integrated installation .. including production equipment, tooling auxiliary equipment and advisory service ...from a single source thereby saving time, money and trouble.

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PAINTS BODIES WITH RANSBURG

Electro-Spray

Automatic electrostatic spray enables Studebaker to apply a heavier and more uniform primer surfacer while giving them a net saving of 1.81 per body in paint and direct labor. Not only is the Ransburg method providing the desirable increase in uniform film thickness, but it is enabling Studebaker to paint more bodies per hour with the substantial savings in paint and labor over the former hand spray method.

The heavier, and enduring, first coat on Studebakers provides the necessary base for the superior finish . . . a finish which resists all kinds of exposure conditions, such as combinations of warm and humid climate, and prolonged bright sun exposure.

Whatever your product may be—large or small—if your production volume justifies conveyorized painting, chances are that one of the RANSBURG electrostatic processes can do the job better, and for less. Write or call for data and detailed information on numerous and varied installations.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

(*Continued from page* 101)

will process bearing parts comi from five bearing cone producti lines. Timken previously had dered for installation by Dec. 1, automatic screw machines whi also will be part of the new co production line. Expansion p gram at its Bucyrus plant will c in excess of $3.5 million.

Cost-Cutting Idea

REDUCING his company's steel costs proved the key to increasing a Westinghouse Electric employee's income. Roland Meyer, assistant staff supervisor in charge of quality control of materials received at the firm's Transformer Division, Sharon, Pa., was awarded $2937 for his suggestion.

He pointed out that it would be possible to delete certain physical requirements from the purchase specification for sheet steel used in the manufacture of transformer radiators.

Adoption of his suggestion has resulted in a reduction of 45 cents per hundredweight in the price of this type of steel purchased by the Transformer Division.

Eutectic Opens Montreal Plant

Eutectic Welding Alloys Co. Canada Ltd., a subsidiary of Eut tic Welding Alloys Corp., Flu ing, N. Y., acquired a plant in Mo treal, Que., for the manufacture welding and brazing alloys, sold and chemical aids.

Colson Buys Michigan Firm

Colson Corp., Elyria, O., p chased the assets of Service Ca er & Truck Corp., Albion, Mi Both companies manufact wheeled products, including m terials handling equipment a casters.

New Process Metals Expands

New Process Metals Inc. ope its new and enlarged plant at 65 Manufacturers Place, Newa

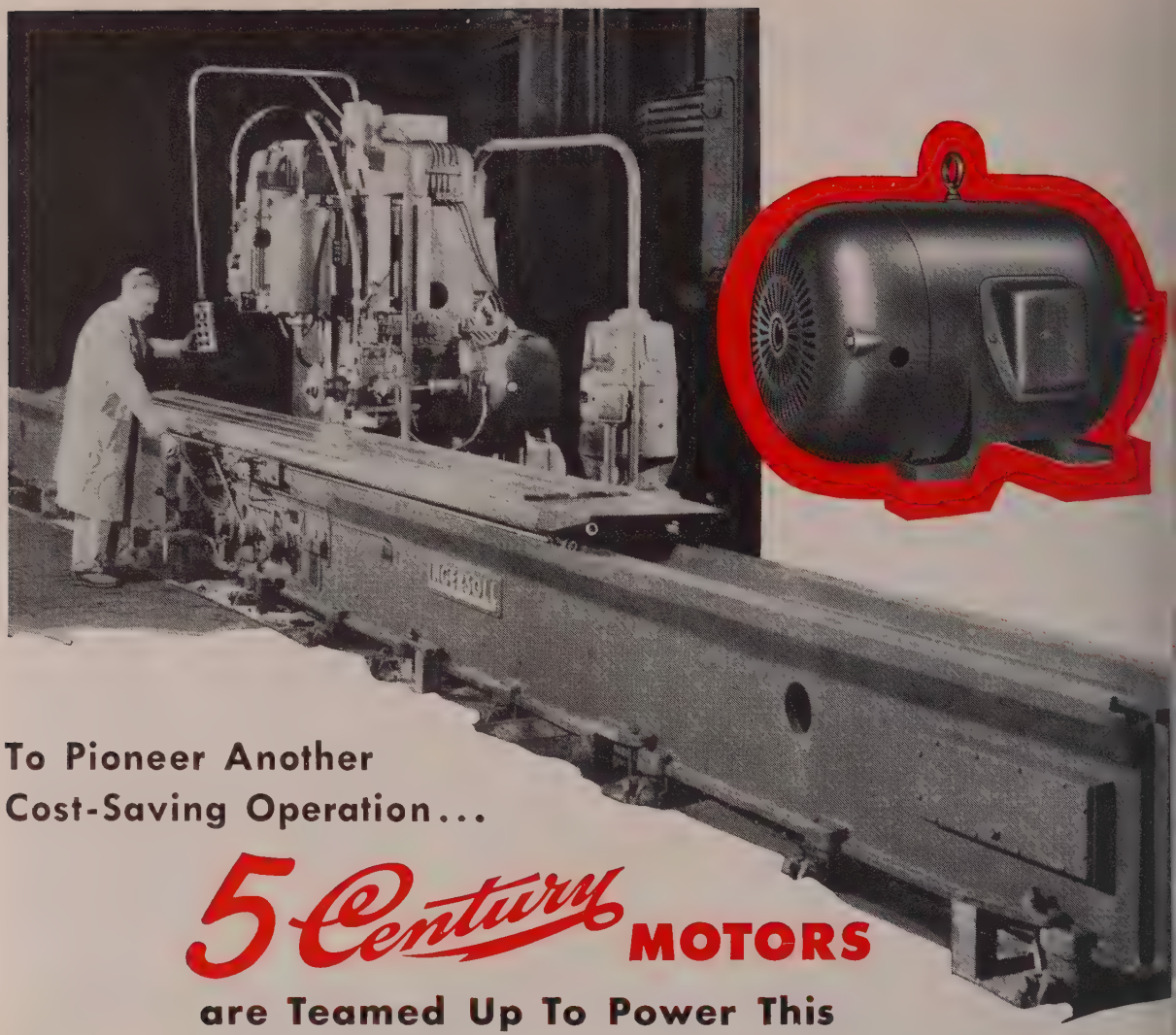
"Yes, we're well satisfied!"

Ask any user of METAL BLAST abrasives whether he's satisfied with the efficiency and economy of ANNEALSHOT or SUPER-ANNEALSHOT. You're bound to get just such an answer as this. For these are *good* abrasives. They're made from the best materials—formed and heat treated as best we know how—and priced as low as we can afford. So, why not try them and be well satisfied, too?

METAL BLAST, Inc., 872 East 67th St., Cleveland 3, Ohio.

METAL BLAST ANNEALSHOT
chilled shot and grit

SUPER-ANNEALSHOT
malleable shot and grit



To Pioneer Another Cost-Saving Operation...

5 Century MOTORS

are Teamed Up To Power This 22-Foot Keyway Slotter

This well-coordinated team of Century motors . . . each one engineered for top efficiency in its own specific job . . . brings out the best performance in this important new piece of equipment.

Here is another example of how leading manufacturers choose Century motors to power their finest metalworking equipment. You'll find it worthwhile to follow their example and specify Century motors on all your equipment. Your nearby Century district sales office or Century distributor will be glad to give you more information.

⅛ to 400 h.p.—A.C. or D.C.—Drip Proof, Splash Proof, Enclosed Fan Cooled and Explosion Proof frames for almost all atmospheric conditions—unusually free from vibration.

800

Century C MOTORS

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

N J. The firm specializes in the manufacture of cerium (misch) metal and other rare earth metal alloys, for which there is an increasing number of applications in the production of stainless steel and ductile iron, as well as magnesium casting alloys, aluminum, nickel and other nonferrous heat-resistant alloys.

Harrington Building Plant

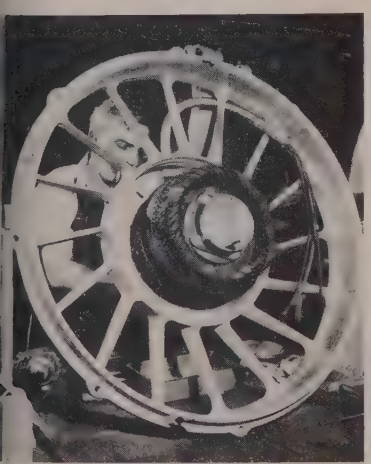
Harrington Mfg. Co., Boston, is building a $3-million plant in Needham, Mass., to contain 300,000 sq ft of manufacturing space. The firm makes jewel cases, metal display packages and aircraft parts.

Globe Buys Los Angeles Firm

Globe Corp., Chicago, purchased the physical assets of Fabriform Metal Products, Los Angeles, which will continue to join by brazing all metals, including stainless steel. Mario R. Glick is general manager of Fabriform; K. L. Glick, production manager; and A. M. Thompson, sales manager.

Stokes Machine Expands

F. J. Stokes Machine Co., Philadelphia, launched a $1-million expansion program that will enlarge its production facilities by 40 per cent. The company makes high-vacuum processing equipment,



Fan Aids Farmers

A worker at GM's Delco Division is assembling a fan developed originally for use on diesel locomotives. This type, with motor an integral part of the fan, is easily adaptable for profitable use by farmers as a crop dryer

an ACCO product

PAGE
Manufacturers' Wire

ROUND
FLAT
OR
SHAPED

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

PAGE makes them all

YOU draw the Shape...
PAGE will draw the Wire

Cross-sectional areas up to .250" square; widths up to 3/8"; width-to-thickness ratio not to exceed 6 to 1.

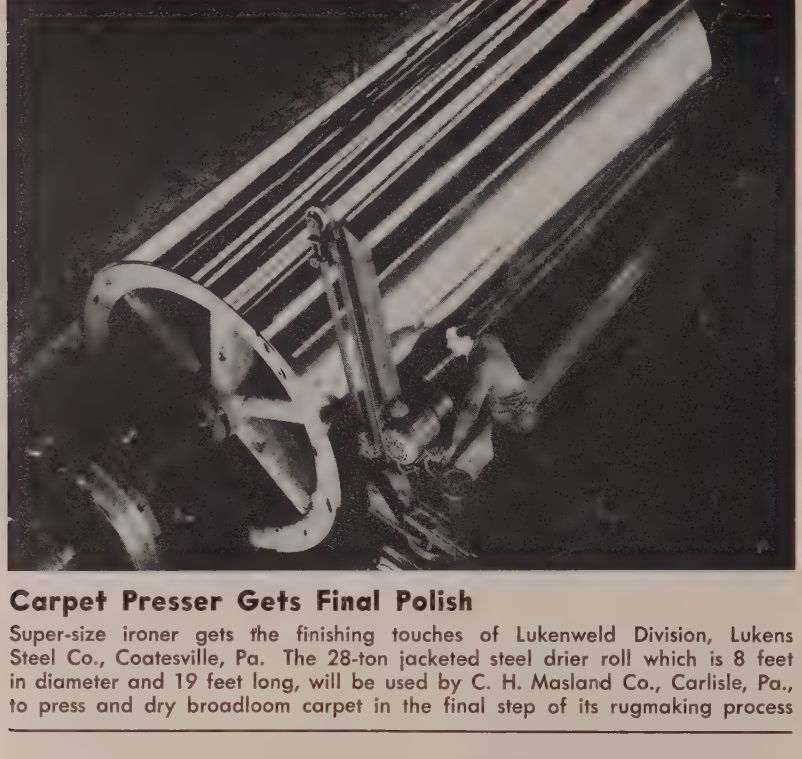
Tell us the way you want it. We'll follow your specifications.

Write or wire today

ACCO
Page Steel and Wire Division
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Welding Electrodes Wires Rods



Carpet Presser Gets Final Polish

Super-size ironer gets the finishing touches of Lukenweld Division, Lukens Steel Co., Coatesville, Pa. The 28-ton jacketed steel drier roll which is 8 feet in diameter and 19 feet long, will be used by C. H. Masland Co., Carlisle, Pa., to press and dry broadloom carpet in the final step of its rugmaking process

vacuum furnaces, vacuum metallizing equipment, automatic loading equipment, and extruders for plastic pipe. Part of the expansion will be a 50,000-sq-ft addition to its present plant in Philadelphia.

Ferro-of-Chile Lifts Output

Ferro Corp., Cleveland, announced that its newest foreign affiliate, Ferro Enamel de Chile-Esmaltes Para Enlozer-Ltda, Santiago, Chile, is now in full production. This firm operates under a licensee agreement by which Ferro Corp. provides technical service. Ferro-of-Chile is producing cast iron and sheet steel ground and cover coats for the sheet steel cooking utensil, flatware and cast iron sanitary ware industries.

Erie Mining Awards Contracts

Erie Mining Co., Cleveland, awarded a contract to Dravo Corp., Pittsburgh, covering the construction of a breakwall, ore dock and harbor facilities at Taconite Harbor, Minn., 77 miles northeast of Duluth. Erie also awarded a contract to Arrowhead Constructors for building part of a 70-mile railroad from its processing plant near Aurora, Minn., to Taconite Harbor. Over-all cost of the taconite project will be over $300 million.

Riverside Expands Facilities

Riverside Mfg. & Electrical Supply Co., Dearborn, Mich., expanded its facilities for the production of wiring harnesses and other electrical components. The expansion was made possible through purchase of all of the machinery, equipment and materials formerly used in the manufacture of wiring harnesses by Pioneer Wire Products, Detroit.

West Coast Firm Renamed

Hamer Oil Tool Co., Long Beach, Calif., changed its name to Hamer Valves Inc.

Brake Shoe Opens Branch

American Brake Shoe Co., New York, opened a sales and technical service office in Duluth in charge of John V. Houston Jr. The company makes a wide variety of castings in wear-resistant materials, hard-facing welding rods, industrial pumps and dredge pumps, as well as railroad products.

Bethlehem Orders Equipment

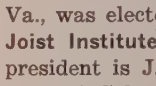
Loewy Rolling Mill Division, Hydropress Inc., New York, is building two heavy-duty roller straighteners for Bethlehem Steel Co., Bethlehem, Pa. Both machines are of the overhung roll type with individual roll adjustment and capable of handling wide flange beam up to 21 inches in height and T shapes of largest dimensions.

Watson-Stillman Expanding

Watson-Stillman Co., Roselle N. J., a division of H. K. Porter Co. Inc., Pittsburgh, establishes sales, service and manufacturing facilities in Rotterdam, Holland through a wholly owned subsidiary, Watson-Stillman International Maatschappij, N. V. Manufacturing facilities were established with N. V. Machinefabriek "Breda," formerly Backer en Rueb, Breda, Netherlands. "Breda" will manufacture hydraulic machinery. The parent firm's manufacturing facilities in Roselle, N. J., will be further modernized with additional production equipment, including a new vertical boring mill, radial drill and engine lathe. Product development will be expanded.

Worthington Moves Operation

Worthington Corp., Harrison, N. J., moved its entire reciprocating power pump operation previously handled at the Harrison Works to its Oil City, Pa., plant. Reciprocating steam pumps continue to be made at Harrison Works.



ASSOCIATIONS

Walter H. Stewart, vice president, Virginia Steel Co., Richmond, Va., was elected president of **Steel Joist Institute**, Washington. Vice president is J. D. Maitland, president of Colorado Builders Supply Co., Denver; secretary-treasurer, C. H. Luedeman.

Donn D. Greenshields, executive vice president, National Screw & Mfg. Co., Cleveland, was elected vice president of **Industrial Fasteners Institute**, that city. The vice presidency is the highest elective office open to members.

M. E. Goetz, manager, Cleveland district steel plant, Republic Steel Corp., was awarded the David Ford

Let's face it!

HAVE YOU A DISASTER PLAN FOR YOUR PLANT?

OMBS...OR FIRE...OR FLOOD...OR TORNADO ..you can handle them if you act now.

Let's face it... the threat of war and the atomic bomb as become a real part of our life—and will be with us or years. Fires, tornadoes and other disasters, too, can trike without warning.

Whatever the emergency is, everybody's going to vant help at the same time. It may be hours before out-ide help reaches you. The best chance of survival for ou and your workers—and the fastest way to get back nto production—is to know what to do and be ready to o it. Disaster may happen TOMORROW. Take these imple precautions TODAY:

☐ **Call your local** Civil Defense Director. He'll help ou set up a plan for your offices and plant—a plan hat's safer, because it's integrated with community Civil Defense action.

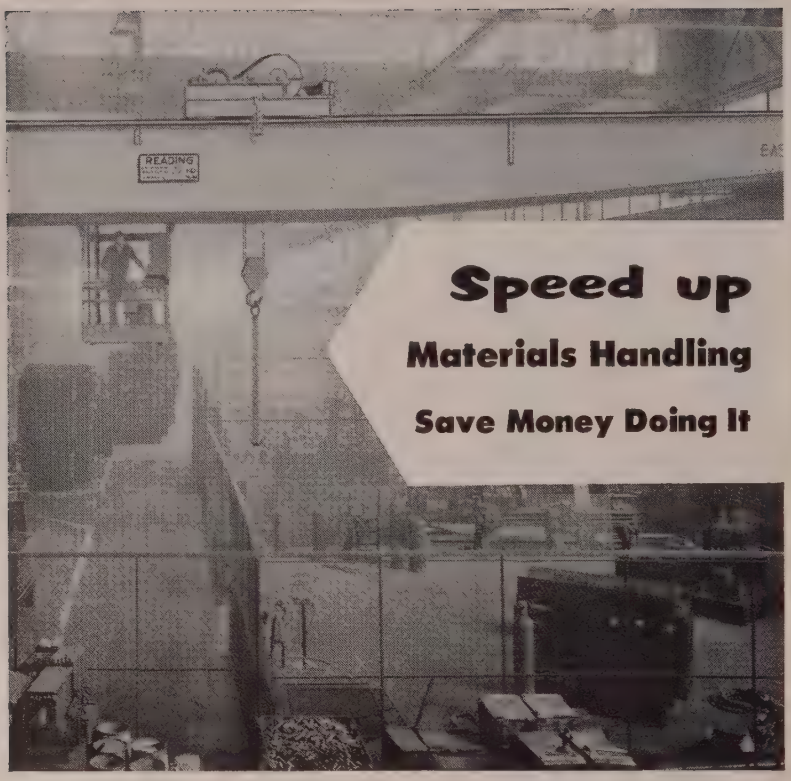
☐ **Check contents** and locations of first-aid kits. Be ure they're adequate and up to date. Here, again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads and official CD films or literature that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.

A PUBLIC SERVICE MESSAGE FROM THE ADVERTISING COUNCIL



Yes, that's a strong promise. But it's being done right now in plants like yours. Here's how:

Match the requirement of your job with a custom-built Reading crane at no extra cost

Imagine, at what you'd normally pay for an "ordinary" crane, you can actually have one "tailor-made" for your own plant. For when you order a READING CRANE, our engineers offer you a choice of several interchangeable motor, trolley and hoisting units.

Known as UNIT CRANE DESIGN, this unique construction method assures greater operating efficiency. It enables you to move more materials at the lowest possible cost. And it helps you reduce maintenance time and save maintenance dollars—any unit can be removed for overhauling or repair without dismantling any other unit!

READING CRANE & HOIST CORPORATION 2102 Adams St., Reading, Pa.

READING CRANES

CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

McFarland award for achievemer in metallurgy by the Penn Sta Chapter, **American Society for M tals.**

Machinery Dealers National A sociation, Washington, elected its officers: President, R. Nathans; first vice president, J. O'Brien; second vice presider Benjamin Weiss; treasurer, R. Rice; and past president, J. Weiss.

Officers of **American Society f Testing Materials,** Philadelphia, f 1954-55 are: President, N. Mochel, Westinghouse Electr Corp., Philadelphia; vice presider R. A. Schatzel, Rome Cable Cor Rome, N. Y.

Material Handling Institute, In Pittsburgh, will run a Materi Handling Institute show in Clev land Public Auditorium, Clev land, the week of June 4, 1956.

REPRESENTATIVES

H. C. Guire & Co., Denver, w appointed sales agent for liftin magnets and motor controlling a starting equipment by **Electr Controller & Mfg. Co.,** Cleveland.

Ampco Metal Inc., Milwauk appointed as its representati William M. Orr Co. Inc., Pitt burgh. Ampco also appointed t following companies as spec licensees: Cadmet Corp., Detro Alloy Steel Products Co. Inc., L den, N. J.

Kaiser Aluminum & Chemi Sales Inc., Oakland, Calif., appoi ed Miratile Mfg. Co. Inc., Chica as a specialized distributor to se ice the Midwest's house trai manufacturing industry.

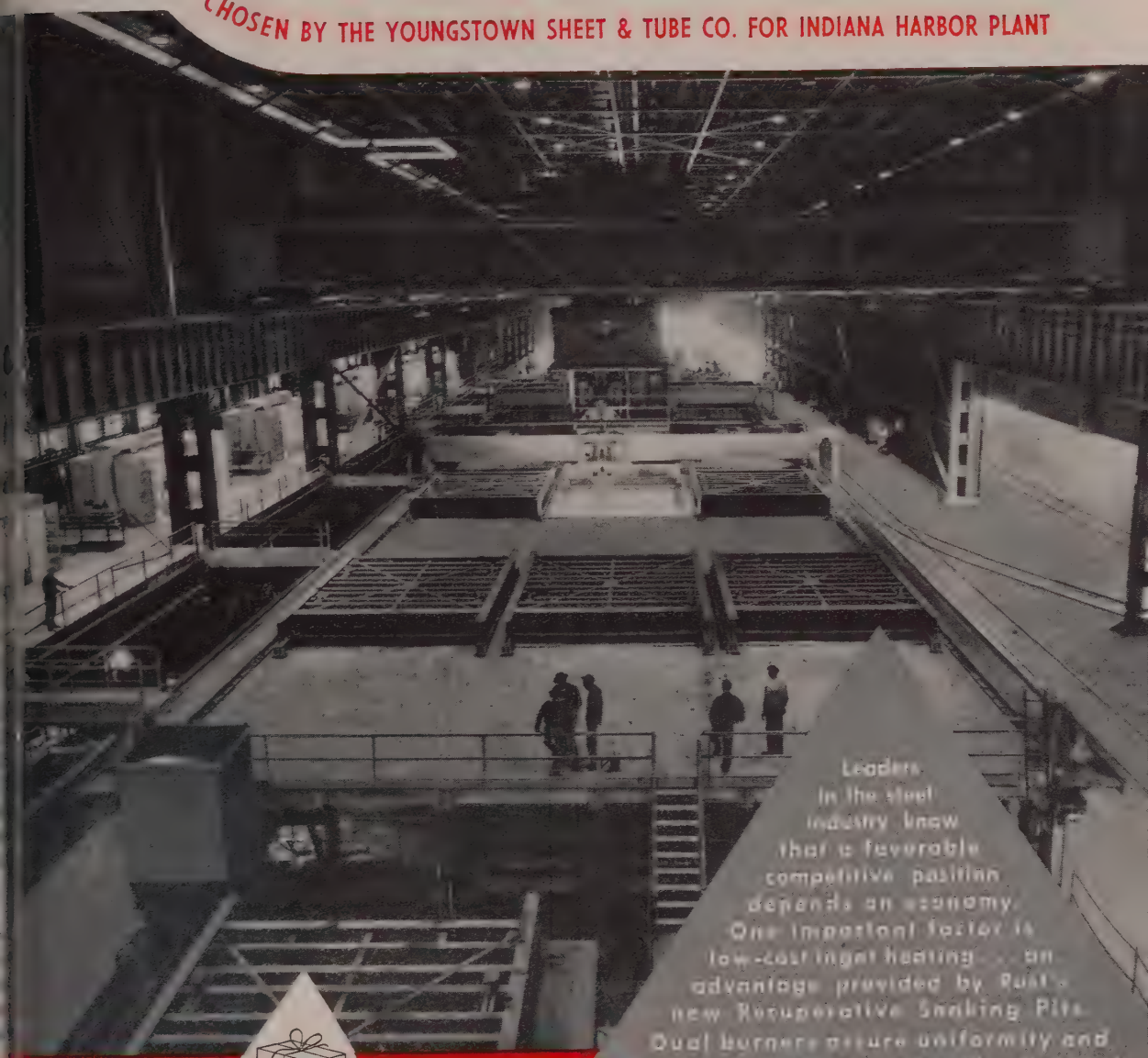
Fielden Instrument Divisi Robertshaw-Fulton Controls C Youngwood, Pa., named Equipm Sales Corp., Kingsport, Tenn., its representative in that area.

Mar-Rail Conveyor Co., P tucket, R. I., appointed as deale A & W Engineering Co., Mia Fla.; Brown-Darnell Co., Detr Davis Material Handling Co., I

CONTINUOUS 2-WAY TOP-FIRED

RUST ... Recuperative Soaking Pits

CHOSEN BY THE YOUNGSTOWN SHEET & TUBE CO. FOR INDIANA HARBOR PLANT



Leaders in the steel industry know that a favorable competitive position depends on economy. One important factor is low-cost ingot heating . . . an advantage provided by Rust new Recuperative Soaking Pits. Dual burners assure uniformity and greater charging capacity. The diagonal two-way firing means balanced heat . . . ingots soak out evenly. Absence of impingement increases life of refractory walls and covers. Design permits construction in additions of two or more holes and use of fuels. Control is fully automatic for trouble-free operation.

Rust builds furnaces for every metallurgical heating need

RUST "PACKAGE" CONTRACT

One contract covers everything . . . from blueprint through start up. Rust assumes responsibility for design, manufacture, erection, and is prepared to undertake all phases of the work with its own forces, including wiring and piping. This results in substantial savings . . . One profit instead of pyramiding ones which accrue where many subs are employed.

RUST FURNACE COMPANY

Pioneers in Furnace Design

[illegible] PITTSBURGH, PA.

Angeles; Fletcher Equipment & Supplies Inc., New Orleans; Freeman Industrial Service, Providence, R. I.; Hardware & Supply Co., Akron; Fred Hill & Son Co., Philadelphia.

Guibert Steel Co., Pittsburgh, appointed General Machinery Corp., Boston, as its representative in that territory.

NEW ADDRESSES

Union Die Casting Co. Ltd., manufacturer of die casting and plumbing goods, moved to larger offices in Whittier, Calif.

Bailey Meter Co., Cleveland, moved its Philadelphia district office to larger quarters at 29 Bala Ave., Bala Cynwyd, Pa. The firm makes industrial instruments and automatic control equipment.

Atlas Chain & Mfg. Co. opened its new home office and factory at 288 N. Main St., Doylestown, Pa.

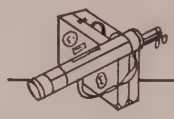
Heppenstall Co., Pittsburgh steel forgings manufacturer, opened a warehouse and office at 6440 Fleet St., Los Angeles, to be operated by W. P. Wooldridge Co., its West Coast agent.

Bohn Aluminum & Brass Corp., Detroit, opened a sales office at 16 E. Main St., Rochester, N. Y., under the management of J. H. Roberts.

Trane Co., La Crosse, Wis., maker of air-conditioning, heating, ventilating and heat - transfer equipment, moved its Little Rock, Ark., sales office to the Pyramid building.

Atlas Tool Co. moved to new factory and office buildings at 1823 W. Slauson Ave., Los Angeles.

Materials handling equipment manufacturing activities of **Barrett-Cravens Co.** are now in operation in its recently completed plant at 630 Dundee Rd., Northbrook, Ill. Activities of its two Chicago plants and its Crescent Truck Division, previously located at Lebanon, Pa., have been consolidated in the new plant.



VACATIONS

Chase Brass & Copper Co. Inc., Waterbury, Conn., a subsidiary of Kennecott Copper Corp., is closing its plants for vacation from July 5 to July 19. The period had been incorrectly reported in the June 7 issue of STEEL. During the vacation period, shipments of stock items will be made from all plants. All Chase warehouses and sales offices from coast to coast will be open and in position to make shipments as usual. Chase plants affected by the vacation shutdown are: Chase Metal Works, Waterbury Mfg. Co. and Noera Mfg. Co., all in Waterbury, and the two Chase mills in Cleveland. In addition, Kennecott Wire & Cable Co. in Phillipsdale, R. I., will be closed for vacation at the same time.

All departments of **Beryllium Corp.**, Reading, Pa., will be closed for vacation from July 3 to July 18.

Bendix Radio, a division of Bendix Aviation Corp., Baltimore, will close for annual inventory from June 28 through July 11. No delivery of materials can be accepted between June 21 and July 11.

Pines Engineering Co. Inc., specialists in tube fabricating machinery, Aurora, Ill., will be closed for vacation from July 3 through July 18.

Westinghouse Electric Corp.'s plants in Sharon, Pa., will shut down July 2 to July 9 for employee vacations.

Waldes Kohinoor Inc., Long Island City, N. Y., will be closed for vacation from July 5 to July 19, inclusive. The shutdown, which will include all manufacturing departments and most offices, does not apply to the company's branch offices. The company's sales, order and shipping departments will function on a limited basis. A shorter shut-down period was incorrectly stated in a previous issue of STEEL.

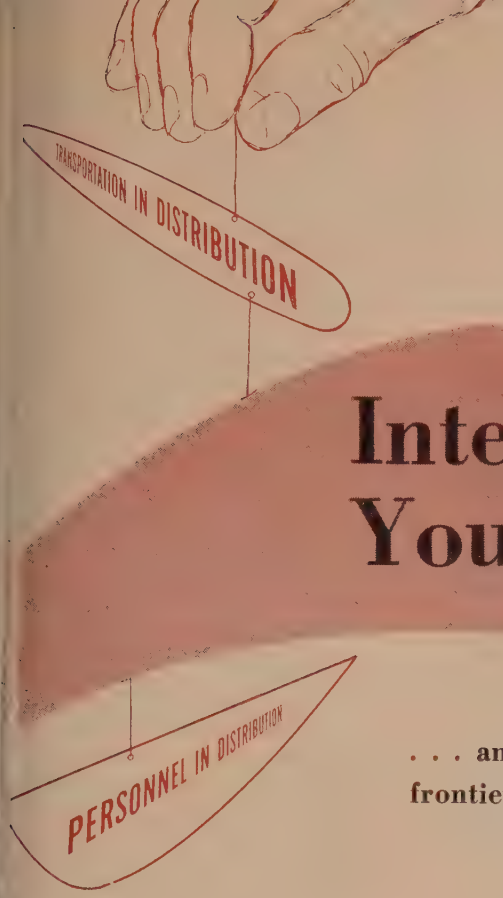
STEEL's 1954 Management Series . . . .

The editors of STEEL herewith present the fifth in their ten - part series, Program for Management for 1954. The complete list:

1. **Now You Have To Sell** (Feb. 22, p. 91)
2. **Build Better Bosses** (Mar. 22, p. 81)
3. **Automation—How Far Should You Go?** (Apr. 12, p. 87)
4. **Stabilizing Production, Employment** (May 17, p. 87)
5. **Distribution—Integration Needed**
6. **Distribution—Training Personnel**
7. **Distribution—Transportation**
8. **Product Diversification**
9. **Foremen—Bridge to More Efficiency**
10. **Product Design**

Reprints Available

If you want reprints of this and the two succeeding articles on distribution, to appear July 19 and Aug. 23, write STEEL, 1213 W. Third St., Cleveland 13, O.



Integrate Your Distribution

. . . and find a new industrial frontier in your own backyard

GENERAL MOTORS CORP. has excellent product research, but so have other companies. GM has superb manufacturing know-how, but so have other companies. However, GM's distribution techniques are second to none; here the corporation has the edge on its competitors; here lies the major reason for its spectacular success."

That's the opinion of one of GM's competitors. It points up the growing recognition of the importance of distribution, an item on which Americans spend nearly $100 billion a year, the Chamber of Commerce of the U. S. estimates.

Definition—Distribution includes all activities of retailing, wholesaling, advertising, servicing and transportation required to move goods from the point of manufacture to the point of sale.

James J. Nance, president of Packard Motor Car Co., says: "Today we have the largest and most efficient physical plant for the production of goods in this nation's history. The American consumer is in a strong financial condition. The two can only be brought together by distribution, the conveyor belt between production and consumption. After 13 years of disuse, this is the one great weakness in our picture. The newer generation of businessmen must learn the arts of distribution."

The Task — Selling may have been pretty sharp in former days, but many businessmen think other aspects of distribution have never been completely learned, let alone mastered.

Charles Harbaugh, manager of the U. S. Chamber's Domestic Distribution Department, believes: "The failure of distribution in the 1930s was one big factor in the depression of that era." Under Secretary of Commerce Walter Williams says: "A new approach to distribution can give renewed impetus to our economy."

T. V. Houser, chairman of Sears, Roebuck & Co. and one of the nation's top students of distribution, points out that the subject "thus far has received inadequate attention by the engineer and technician." All students of distribution agree that mass production, to be effective, requires mass distribution; the two are the Siamese twins of our economy.

Motive — Why should you, a manufacturer, bother about distribution? It may be important to somebody else, but you generally deal with relatively few customers, and the subject seems far less complicated than manufacturing.

That's about the way Elgin National Watch Co. thought nearly two years ago as it planned a diversification program. In selling watches, it felt that it had already grappled with some of the toughest distribution problems in America. In its plans to diversify by acquiring a company or companies in the miniature electronics and precision production instrument

Distribution Cost: Annual Bill Soars

Merchandising Service Payroll	$21,000,000,000
Nonselling Service Payroll of Distribution	21,225,000,000
Employee Benefit Expense	8,000,000,000
Costs of Financing Distribution Inventory	1,000,000,000
Cost of Constructing New Distribution Buildings	1,000,000,000
Construction Expenses for Maintaining and Modernizing Existing Buildings (includes installation of permanent equipment items)	2,000,000,000
Interest Cost of Financing Consumer Credit	1,000,000,000
Insurance Premiums	1,000,000,000
Supplies and Equipment Expenses for Paper Work	1,000,000,000
Transportation Expense	15,000,000,000
Taxes Paid by Distribution	10,000,000,000
Advertising	5,000,000,000
Communications	500,000,000
Gifts	200,000,000
Permanent Display Expense	1,000,000,000
Temporary Display Expense	500,000,000
Building Occupancy Expense	2,000,000,000
Maintenance and Replacement of Special Service Equipment	500,000,000
Packaging	5,000,000,000
Storage	2,000,000,000
TOTAL*	$98,925,000,000

* All figures are estimates. Figures given under each general type of service include some duplication of expenses incurred for other types of services. A few items of expense are non-cash items, such as discounts to employees on merchandise purchased.

Source: Chamber of Commerce of U. S.

fields, it felt that distribution of those new products would be fairly simple.

Turn About—But the more Elgin studied the qualities it hoped to get in a new affiliate, the more it realized that its historic distribution methods would be foreign to its proposed new products. So, in revising its list of specifications for a new division, it gave greater importance to the requirement that the company being considered for purchase have an established and efficient distribution system.

Whether you make fasteners or television sets, distribution is important to you: It costs money, and it can improve your sales by broadening your markets.

The Cost—On consumer durable goods, the average distribution cost is about half the retail price. Take a television set selling for $340. The cost of production, including the maker's profit, is about $165; manufacturer's distribution cost is about $20; other distribution costs, including distributor's profit, is about $140; taxes and royalty are about $15.

The farther away from the end-item classification a product gets, the lower becomes its distribution cost. But even for the basic fastener, the distribution cost is probably at least 15 per cent of the selling price to the customer.

Pitfall—The lower cost for components is the cause of one of the major problems in distribution. Most of the attention today comes from retailers, wholesalers and manufacturers of products for sale to the public. Makers of products for sale to other manufacturers, with a few brilliant exceptions, have tended up until now to underestimate the difficulties and granted them woefully inadequate consideration.

There are encouraging signs of improvement, according to a survey by STEEL of some 5000 metal-working companies, most of them producing equipment or components for other manufacturers. Thirty per cent of the respondents recognize cost-cutting possibilities in distribution and intend to cut costs in 1954. That's remarkable because most of the same companies are expanding their sales efforts this year. Selling costs alone will rise 5 per cent.

Some 70 per cent of the respondents expect to take positive steps to broaden their markets through better distribution in 1954. Larger companies, by the way, appear more aware of the possibilities in distribution than do the smaller firms.

Ammunition—How does industry propose to improve its distribution to cut costs and broaden markets?

There are five major techniques. More efficient selling, better marketing research, improved distribution personnel training, a new approach to the physical movement of goods from the production line to the buyer and improved integration of distribution and manufacturing functions.

The first two techniques have been discussed in earlier articles in STEEL's Program for Management (selling, Feb. 22, 1954, p. 91; marketing research, Dec. 7, 1953, p. 125). On July 19 personnel will be discussed and on Aug. 2 developments in the physical movement of goods will be outlined. The remainder of this article deals with integration.

Guideposts — There are three major ways to improve integration: Modify the distribution system to tie in better with production conditions; modify the pro-

ıction approach to conform bet-
r to distribution conditions;
odify—or educate—your custom-
's' understanding of your prod-
ct.

Modifying Distribution

A manufacturer of materials handling equipment operated several plants around the country—a different staff of salesmen represented each plant that made different parts or accessories. The customer had to go to different salesmen for integrated equipment; it was like buying a radiator for your car from one place and the motor from another.

Top management of the materials handling firm finally realized the handicaps it was unnecessarily placing upon itself and integrated its distribution setup without touching manufacturing operations.

The result: A 15-per-cent increase in sales during the first 12 months of integration, but even more significant, a 20-per-cent increase in profits due almost entirely to the revised distribution arrangements.

Obvious?—The solution to the materials handling firm's problems seems obvious, yet this well-managed company had been operating the old way for years. Students of distribution point out that methods in most organizations, like Topsy, "just growed." It's rare to see a manufacturer plan his distribution as carefully as his production. What company in the U. S. doesn't have an executive who functions as director of production? But how many have a director of distribution?

The top sales executive comes closest to fulfilling that role, but it's unusual if he has responsibility for more than sales, advertising and marketing research. Other functions of distribution—traffic management, warehousing, packaging, even personnel training—are too often the sole responsibility of some autonomous executive.

Supervision—True, no one official in a medium-sized or large company can be expected to manage all functions of distribution, but he should have the responsibility of supervision, just as the average director of production supervises many departments. Can you start to integrate distribution to function in tandem with production if your top management in charge of that activity is not integrated?

The materials handling company found that integration of distribution management was its top problem, but it discovered it had to resolve a related difficulty, too.

When does distribution's responsibility end and production's begin? In traffic management, warehousing and packaging, distribution and production responsibilities overlap. But a consensus holds the prime responsibility in those areas is distribution's.

Inventory Control—In still another debatable area, inventory control, the responsibility is becoming more and more distribution's. At Graybar Electric Co. Inc. the sales department has the responsibility for:

1. Preparing an estimate of the volume of sales to be expected on each item to be included in the finished-goods inventory.

2. Reviewing at regular intervals the stocks on hand in relation to current and anticipated sales.

3. Developing special sales campaigns to push slow and obsolete items.

At each of its district headquar-

Re-examine Your Distribution

1. **Take a new look at your product line; fit it to customer needs; check profits on each line; check competitive products as thoroughly as your own.**

2. **Study the best channels through which you may distribute your product. Figure out who uses it and the best way to tell the user about it.**

3. **Take pricing responsibilities away from the accountants and credit men and give them to sales management. Above all, simplify pricing terms, discount systems. Simplify pricing lists and catalogs. Use prices as a sales tool.**

4. **Check your packaging. Packages should be easily opened, properly labeled, easily stacked, economically shipped.**

5. **Integrate your sales management to assure that customers are called upon frequently enough. Keep sales reciprocity records. Keep track of inventories.**

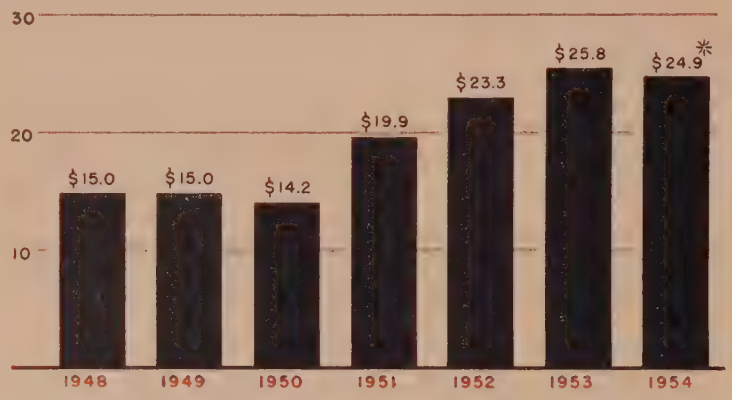
6. **Solve the problem of availability. It's distribution management's function to have enough material to sell and the transportation to get it to the buyer quickly.**

7. **Check information transmittal—advertising, booklets, promotional campaigns.**

8. **Check your sales efficiency and effectiveness.**

Jammed-Up Inventories

Manufacturers' Durable Goods Stocks Stay High



* Estimated by STEEL; source for other figures: Department of Commerce, Office of Business Economies.

ters, these steps are taken to determine inventory:

1. The sales department heads recommend the items to be stocked. (If Graybar were a manufacturer, it would be the items to be produced).

2. The stock-disbursing clerk, with the help of the buyer, tries to order in accordance with the sales department heads' recommendations, the factory shipping schedules and his own judgment, based upon current conditions.

3. Usually every four to six months, each sales department head reviews his recommendations and makes corrections.

4. The quantities of all items in inventory are generally set below the maximum, determined by number of days, for the district.

Big Job—With durable goods inventories hovering near $25 billion (see chart above), inventory control is a major task for distribution. And it's a tricky one that must be done in co-operation with production personnel. That's because the purchase of raw materials is primarily a production responsibility, and the decision about the level of finished stocks is primarily a distribution function.

The auto industry has mastered the problem of distribution's role in inventory decisions. That's one reason why its distribution costs are less than 25 cents per customer dollar—on other consumer durable goods this cost averages 50 cents per customer dollar. That 25 cents comes out of the net effective price of the car (total price, less the usual overallowance for the turned-in used car).

The Reason Why—How do the auto people do it? "It's through integration and control of our distribution setup," says E. M. Braden, general sales manager of Chrysler Corp.'s Chrysler Division. "Distribution is the controlling factor in today's economy." Chrysler Division has just revised its distribution setup and figures a 10 to 12-per-cent saving already on costs by improved advance planning.

Chrysler, like practically all other auto companies, asks dealers to make estimates of 30-day needs. At the end of June, dealers will estimate for August, September and October. Firm orders will come in for August, just opinions for September and October. In late July, September estimates will be firmed up, and so on. Th home office for Chrysler Divisic and every other auto compar uses these estimates as a basis f planning production.

The Ten-day System—Chrysle like practically all other produ ers, has a ten-day reporting sy tem for dealers. On the 10th, 20t and 30th days of the month dea ers report stocks of new and use cars. On the 30th they also i clude the estimates for thr months ahead. This helps t home office in its planning and a so aids it in keeping in touch wi its independent dealers.

Chrysler, like other producer gives business management aid t dealers. Beginning in May, started an intensive course on th subject in Detroit, Atlanta, Chic go and the West Coast for deale in those areas. By taking a fe at a crack, specially trained tean in the four localities will sho dealers how to recruit and trai salesmen, how to absorb ove head, how to use income that available from sales of new an used cars, parts and service. Th program will take about 32 week

Spot Attention—Chrysler als gives spot attention to individu problems. For example, a deale in upper New York state was n doing as well as expected. Chry ler examined the dealer's expens structure and his revenue fro service, parts and used and new car sales. It found no glarin single error, just a looseness i planning. So, it projected forwar sales for each and estimated a $86,000 annual profit. It set up daily close-of-business inventor for the retailer, too.

All estimates may not be fu filled, but the dealer now has track on which to run, and almos every 24 hours he can know if hi pace is close to par.

That's the sort of thing tha all the auto companies do to in tegrate distribution. S. D. Hop kins, director of sales for Gener Motors Corp., points out that G has consulting services availabl to dealers. Also, dealers are aske to keep books in a standard a counting system.

The Flow — GM's distributio channel works like this: An Old mobile dealer, in Peoria, Ill., sa sells an Olds 98, four-door, gree

l white, with radio, heater, de-
ster and turn signals. If he
it in stock from earlier or-
s or can get it by trading with
rby dealers, the customer gets
car almost immediately. But
he must order it from the fac-
y, the car, under today's condi-
ns, will be delivered in about
ee or four weeks. That length
time, incidentally, is considered
triumph of distribution know-
w. Delivery time is an impor-
nt consideration, and all stu-
nts of distribution are trying to
t down the lag.

When the Peoria dealer orders,
sends it in to his zone head-
arters, in this case Chicago. Chi-
go accumulates the orders and
nds them in to the Lansing,
ich., plant. If the factory is be-
nd, the zone fills out its prefer-
ce as to the order in which the
rs will be built. Customer or-
rs are built first, stock orders
me second.

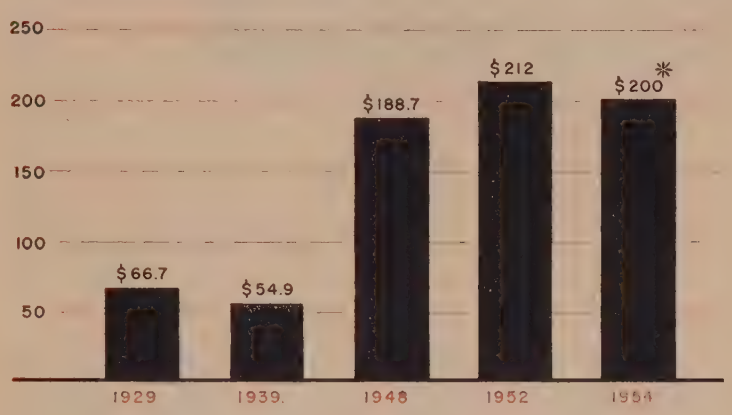
The Specialty Problem — The
pecial order is a first-class prob-
m in distribution today. Clare
riggs, vice president-sales for
ackard Motor Car Co., says that
ackard could build 200,000 cars,
o two the same because of op-
ons in color and equipment. "The
rick here," says Mr. Briggs, "is
o train the dealer to persuade the
uyer that what he has on the
loor is what he wants." All auto
nanufacturers are struggling to-
ay with optionitis. None of them
ikes it, but the trend is to more
nd more of it. "The buyer wants
something a little different," ex-
plains Mr. Briggs. "It's our job
o figure a way to give him what
he wants and still keep our mass-
production and mass-distribution
system functioning."

Optionitis is not confined to au-
tos. Manufacturers of every end-
product from lift trucks to refrig-
erators know the trend is growing.
Some automotive men believe that
in addition to persuading dealers
to sell more of what they have,
the specialty order can be ab-
sorbed: 1. By better electronic
order processing equipment at the
zone and home offices; 2. by as
many assembly plants as possible
and 3. by streamlined distributing
setups with the home office as
close to the dealer as possible.

The trend in many automotive

Wholesalers Move the Goods

Maybe They Can Move Yours, Too



* Estimated by STEEL; source of other figures: National Association of Wholesalers.

quarters is to cut down on the number of zones, distributorships and other intermediary organizations between the home office and the dealer.

The Way You Distribute—Auto men agree they don't want to set up some substitute for the independent dealer. Experience has shown that he sells cars best. At times, the auto manufacturer has owned dealerships, and even now, special circumstances may dictate company ownership in a case or two. But on the whole, that doesn't work well. Other schemes may fall just as flat, as Sears and Kaiser Motors Corp. proved when the former unsuccessfully tried to distribute the modified Henry J, which it called the Allstate.

Independent dealers, of course, may not be the answer for lift truck manufacturers, for example, but the auto experience shows that it's important to know what type of distribution channels will best integrate with your product and type of manufacturing operations.

Case in Point — A nationwide metalworking firm sold the Michigan cities of Midland, Saginaw and Flint through its sales office headquartered in Detroit. It prided itself on the fact that its direct sales approach in that area won it 10 per cent more volume than that of its closest competitor who sold through independent wholesalers.

But the direct-selling firm received a severe jolt when it came upon some figures that proved its wholesale-distributing competitor was making 7 per cent more total profit on the 10 per cent less sales in that Michigan area. The direct-distributing firm for the first time analyzed its sales expense, soon found what was wrong. In that section it was spending $20.30 per call and $100 per sale. But the wholesale-distributing firm wasn't spending anything like $100 per sale.

Moral: The factor determining your kind of distribution is not what generates the biggest sales volume, but what generates the biggest profit.

It's Up to You—Only you can determine the kind of selling that will produce your best profits. It's likely that a combination of two or more types will serve you best if you operate in many geographical areas.

For example, the wholesaler

American Can Co.

New Packages . . . New Buying Habits

New methods of packaging, like these cans for soft drinks, create new consumer demands and habits. Packaging is undergoing a revolution which is part of the great changes occurring in distribution. In spite of current business declines, packaging machinery orders and backlogs are up 14 per cent and shipments probably will be 11 per cent higher this year than in 1950-1953.

Even the government, notorious for its conservatism about packaging, is finally recognizing industry's potential for cutting costs in that field. It's now prescribing performance specifications of packing and packaging instead of specs telling the manufacturer exactly how to package the product. The Navy plans a program to reduce tare weight of its packages 25 per cent—and save $9 million by doing so. The Navy's total transportation charge for packed items last year was $105 million, and $35 million was paid for shipping packing materials making up tare weight alone.

that served one company so well in Michigan may be just the man for you, too (See table on p. 117). Some 210,000 wholesalers are an especially good media if you want a lot of independent retailers serviced economically. Wholesalers mostly handle consumer goods.

Industrial Supply—If you have a lot of customers to service, but your product is a supply item used by manufacturers, perhaps your best channel is the industrial or mill supply house. It specializes in handling precision tools, regular hand tools, abrasive products, mechanical rubber goods, fasteners, tubing, bearings and similar items. All industrial suppliers will do a business of nearly $4 billion in 1954.

If you're small or medium-sized and can't afford a direct sales branch, a manufacturer's agent may be best for you. Some 5000 of them are selling metalworking products—mostly components that go into end-items—on a contingency basis, compared to about 4100 in 1948 and 3500 in 1939. They handle sales amounting to an estimated $3 or $4 billion annually and usually charge 5 per cent commission.

Own Your Own?—Or, perhaps, your direct branch salesmen are best. Most manufacturers of hard goods other than consumer durables find that's the most satisfactory in heavily industrialized areas where their salesmen can make many calls relatively inexpensively.

The question of direct factory selling of consumer durables is more debatable. As already indicated, automakers frown on it. A few appliance makers, operating in limited geographical areas, do successfully.

Nationwide Distribution? — Geography is a big factor in integrating your distribution with production. Just to sell nationwide for the sake of being a "national" company is ridiculous, yet a lot of companies sell coast-to-coast for no other reason. That was a point especially emphasized by speakers at an American Management Association conference on distribution in May.

Shell Oil Co. until the early 1930s was marketing in 48 states—a mile wide and an inch deep. It lost $21 million in 1931 and that forced it to reappraise its distribution methods. It discovered it was losing money by marketing in some states, so it pulled out of them. Now it's not nationwide, but it netted $115 million last year.

Lease?—Or, perhaps, the how and where of selling isn't the whole answer to your problem of integrating distribution with production. More and more capital equipment producers are experimenting with leasing their product (see STEEL beginning Mar. 29, p. 67). That's essentially a distribution device that supplements, not supplants, selling.

In Summary—If in seeking to integrate distribution with production you have decided that your distribution system needs modification most, first organize that system logically and charge one executive with over-all responsibility. Then analyze how to sell (or lease) your different markets. If you have had Joe as a customer for 25 years and give him direct treatment on a $100-a-month order, but sell Jim a $10,000-a-month order through a branch office, re-examine that setup. Direct selling to Jim might yield $20,000 a month, while Joe may be kept through mail solicitation.

Modify Production

Another way to integrate distribution and manufacturing is to modify your manufacturing cor-

ot rather than your method of
tribution.

That's essentially what Hotpoint
. did when it had its sensational
es rise in the 1930s and 1940s.
didn't change its distribution
chniques much, but it broadened
product line so that it had
oducts to appeal to every pock-
book and every appliance need.

GM's Secret—That's essentially
eneral Motors' secret distribution
unch, too. No matter what price
nge or style appeals to you in
tomobiles, GM has it. Ford is
portedly readying another car
r the market, something along
e lines of its old Continental.
ord Motor Co. is also turning the
tionitis problem to its own ad-
ntage by upgrading the Ford
ith optional equipment so that it
n be offered in wider price ranges.
he reason is to broaden its dis-
ibution, to reach an additional
ass of buyer. Chrysler, too, is
radually separating the Imperial
om the regular line of Chrysler
rs.

A lot has been said and written
bout manufacturing and tax
conomies that should result from
ne merger of Kaiser and Willys
nd Nash and Hudson. But a far
nore important benefit could re-
ult from gains in distribution.
oth the new Kaiser Motors Corp.
nd American Motors Corp. will
ave a broader price and style
ange to offer the public, more
lealers to snare the buyer.

Just Talk?—Talk now is of a
Packard-Studebaker merger. Dis-
ribution benefits would be the
rime reason for such a move, if it
ver comes about. The more nu-
nerous the distribution outlets
nd the wider the price range that
an be offered the buyer, the bet-
er, generally, is a company's dis-
tribution picture.

Of course, a company with too many outlets and too many products can get into trouble with its distribution, too. Market research and careful distribution cost accounting can avoid disaster.

The Sears Case — Still another kind of integration is possible by changing the timing of production and accepting the established kind of distribution. That is possible with such distributors as Sears.

It worked out arrangements with a manufacturer of the highly seasonable shotgun: It could maintain stable production with stable employment over the entire year, even though the demand for the gun in August, the peak month, has been as much as 69 times higher than in April, the lowest month.

A Job for Research—By calculating demand in advance and ordering in advance, Sears enabled the supplier to keep its variation in number of employees at not more than 10 per cent. Sears' Mr. Houser says: "Case studies show a year-end saving of at least 10 to 12 per cent in cost when a highly seasonable article is produced steadily throughout the year" instead of in response to the vagaries of demand.

Not everybody can do this. Auto companies, prosperous as they are, can't afford to stockpile or warehouse many cars. Smaller companies can't afford to stock their product for long months even if it's inexpensive. The best bet for companies in that category is to work up campaigns to sell their product in the off-season or to develop new products that can be sold through the same distribution channels in the off-season.

Educate Customers

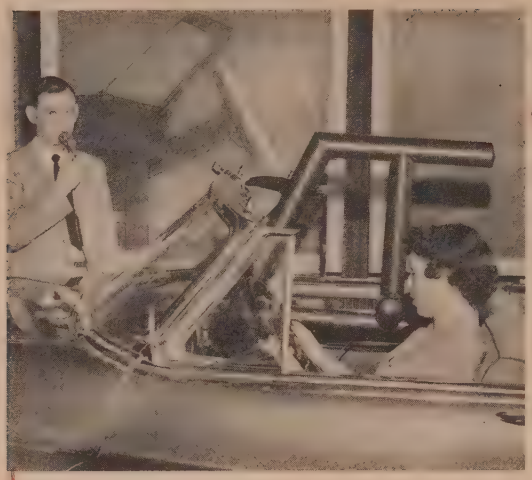
A third major way to unify production and distribution is to modify—or educate—the customer and change production and distribution techniques only slightly.

All the production and distribution integration in the world won't help if a customer doesn't fully understand the uses of a product, doesn't use it correctly or safely. Distribution and production efforts are better utilized—better integrated—when the customer is getting fuller use of a product as a result of better packaging and labeling, more concise instruction booklets, more informative advertising, how-to-use-it sales promotion and helpful industrial movies.

Indirect Aid—Peninsular Grinding Wheel Sales Corp. spent $28,000 on a movie to show the principles of safety in handling grinding wheels. There's no direct sell-

Train and Gain Customers

Training users of your equipment or product often is as important as training salesmen to sell it. Here's one of many approaches to the problem, by Clark Equipment Co. Its mobile service school can be loaded into a truck trailer and set up temporarily in convenient locations to aid industrial users of its materials handling equipment.



Learn What The Buyer Wants

Still another way to integrate distribution and manufacturing is to find out what customers want so that distributors can distribute and manufacturers produce a correctly designed product. General Motors does this to the nth degree. This driver measurement test is one method. Installed at 1953 and 1954 Motoramas, it determines the driver's preference as to seat height, steering wheel position, etc. In 1953 more than 8000 people were tested, and this year a greater number have noted what they prefer. Results are punched on IBM cards, then computed so that the statistics can aid designers on coming models.

GM also sends more than 2 million questionnaires a year to car owners on 30 to 40 different subjects. This, too, leads to information invaluable in model designing.

ing in the film, and it was made because Peninsular was "appalled at the waste and injury resulting from unsafe practices by shop men." Dozens of films of this type are now available to help the consumer use the product better.

And there are many other ways to get customers to use the product more efficiently, too. Great Lakes Carbon Corp. gives a course to consumers on how to use fewer arc furnace electrodes. The company explains its seemingly paradoxical behavior this way: "By helping the men understand the 'why' of proper electrode care and handling we can contribute to the lowering of electric steel costs. This, in turn, should further the growth of that industry, thus ultimately increasing the market for electrodes."

Instructive Instructions—A lot can be done, too, with instruction booklets. "Most instruction manuals today," charges an advertising executive, "are too long, too complicated, uninformative and atrociously written." The reason is that the job of compiling a manual is too often entrusted to someone who has had little experience with writing. Let your production men or engineers assemble the facts about using your product; get a writer to write them.

Instructions can often be condensed to go right on the package, but take it easy. Brevity can be the road to obscurity.

Big Business — Labeling and packaging are a science and a big business today. You can educate your customers to new buying habits and product uses through revised packaging. Frozen food processors attribute much of their success to shrewd packaging. A fastener manufacturer with important volume coming from reta sales boosted his gross 11 per cer by putting an assortment screws in a plastic box, instea of merchandising one-of-a-kir screws in each cardboard contai er.

Packaging is a $7-to-$10-billic business annually. Packagin boosts sales impact whether in hardware store or a factory. protects the product until it's sol It enhances the product. It hel the buyer by telling him what inside. And most packaging us ally costs less than 0.1 per cent the total price of the product.

By Your Own Bootstraps

Look back less than 100 year and you can see the impact on t economy that a change in distr bution can bring.

Then the railroads were deve oping to knit this nation togeth into a mass market that made po sible mass distribution and ma production.

Signs of the Times—Now sig are everywhere that another rev lution in distribution is upon u but this time it's coming in bi and pieces. Every day you c see some of the places where it already happening — self-servic food stores, suburban departme stores, giant shopping centers, ne transportation ideas.

At the manufacturing level, it not coming quite as fast. But y can speed up the process by int grating distribution with manufa ture—by modifying distributi to jibe better with existing pr duction practices, by changin production practices to match e isting distribution techniques, educating the customer to use t product better or by using a co bination of all three of the pr ceding methods.

A lot is known about mass pr duction—its techniques, its cos to the fraction of a penny, its pe sonnel requirements. Much le is known about distribution. production we are like airmen w fly with instruments and control In distribution we are like a men of the 1920s who flew by t seat of their pants. There a the brilliant Lindberghs in distr bution today, but additional know edge and additional thinkin would turn out far more.

McLouth STAINLESS Steel

High quality stainless sheet and strip steel . . . for the product you make today and the product you plan for tomorrow.

McLouth Steel Corporation
DETROIT, MICHIGAN
Manufacturers of Stainless and Carbon Steels

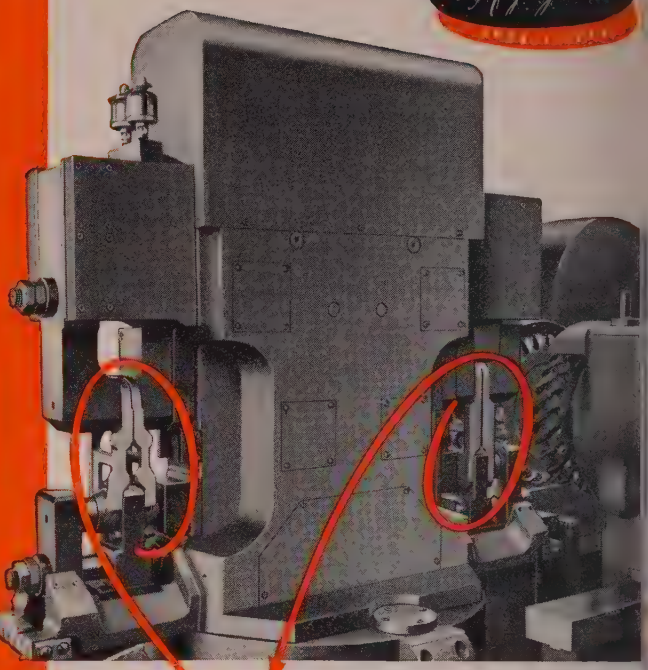
Duplex Milling

as Engineered by

MOTCH & MERRYWEATHER

may end your search

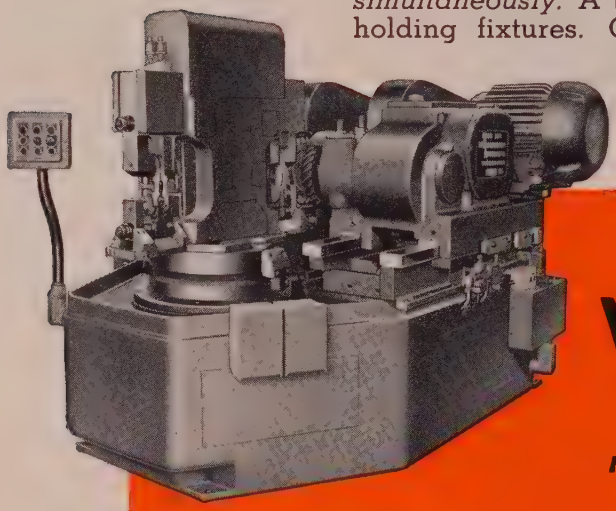
Fifty Years



Both sides of tractor side bars are face milled. Production is 240 pieces per hour using high speed steel cutters.

PRODUCTION CAN BE RAISED 50%
by Motch & Merryweather's *Duplex Milling Method!*

• Production milling is given new meaning by Motch & Merryweather's duplex method. Two heads mill two parts *simultaneously.* A table indexing 180° has two sets of work-holding fixtures. One operator unloads and loads during *duplex milling* at the opposite fixture. Fully automatic operation sets new production limits. Consult Motch & Merryweather about your production milling.



THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

Technical Outlook

NEEDED DATA— At the ASTM Meeting in Chicago last week, R. F. Miller, U. S. Steel Corp., Pittsburgh, gave results of a co-operative industry investigation on the elevated temperature strength of present-day carbon steel plate and seamless pipe in the service condition. One point: Strain aging (judged by elevated temperature tension tests) is associated with uncombined nitrogen in the steel. It was reduced or eliminated in heats made to fine-grain practice by stress relieving at 1150° F, which ties up the nitrogen with aluminum.

LESS CREEP— At the same meeting, J. H. Port and A. I. Blank, Chase Brass and Copper Co., Waterbury, Conn., reported: The creep strength of annealed 90-10 copper-nickel alloy, containing 1.08 per cent iron, is two or more times that of the same alloy containing 0.68 per cent iron. Tests were made in the 300 to 500°F temperature range.

TOUGH JOB MADE EASY—Reflection or absorption of ultrasonic energy at a bonded interface can be used to check quality of bonded materials, according to Magnaflux Corp., Chicago. Test is used on Stellite tipped valves for auto and aircraft and asbestos-backed bands for automatic transmissions and brake bands. Inspection can be made semi-automatic to give low cost control with unskilled operators.

LEAVE OFF FRILLS—Drafting stripped of its frills, yet surrendering nothing in clarity, presentation, or accuracy of dimensions, is the definition of a new standard of drafting practice, says Arthur H. Rau, General Electric Co. manager of drafting. Simplified drawings can be made in an average of 35 per cent less time than elaborate delineations. Freehand drawing is both practical and economical. Drawing time is reduced 20 to 40 per cent.

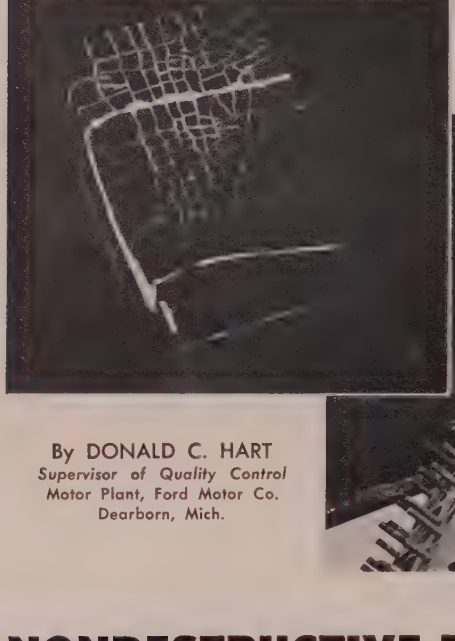
POWDER TITANIUM USES— Look for widespread use of the powder metallurgy techniques for making structural parts out of titanium, predicts Dr. Paul Schwarzkopf, president of American Electro Metal Corp. Laboratory process for converting titanium scrap to high-purity powder and then into critical aircraft engine parts has already been developed.

SPEEDY NORMALIZER— A new type of continuous, in-line heat transfer process which normalizes oil and gas-carrying welded steel pipe in 66 seconds—instead of 21 minutes—is at work at Lone Star Steel Co. in Texas. Selas Corp. of America built the units that can normalize the welded seams of pipe to keep pace with the welding speeds of 50 to 150 feet of pipe per minute.

ALUMINUM HARD COAT— Results of tests on Martin Aircraft's hard coat process for effecting a tough oxide coating on aluminum reveal wear resistance far above standard anodizing treatments. It's equal to or better than thin cyanide coatings on steel. But fatigue strength drops up to 65 per cent in the base metal, which means the material is no good in cyclic stress. Coating increases corrosion resistance in aircraft service, too.

SMOOTH FINISHING— An example of how precise modern tumble finishing can be is its use on jet engine blades. Burrs are removed, additional radius is applied to the edge of the blade itself and blade surfaces are ground down to the required micro-inch finish. Almco Division, Queen Stove Works Inc., Albert Lea, Minn., says that a final finish as low as 5 microinches or even less, when needed, can be obtained.

TECHNICAL OUTLOOK TECHNICAL



Fluorescent penetrant (left) shows cracked carbides. Ultrasonic check is made for metal thickness (right)

By DONALD C. HART
Supervisor of Quality Control
Motor Plant, Ford Motor Co.
Dearborn, Mich.

NONDESTRUCTIVE TESTING

Checks Quality from Start to Finish

Automaker relies heavily on a host of techniques, including x-ray, radiography, magnetic particle, surface temper, dye penetrants. Metal thickness is measured ultrasonically

NONDESTRUCTIVE testing people at Ford play a key role in in-process and end-product quality control.

They use x-ray, radiography, magnetic particle, surface temper and dye penetrant inspection, plus ultrasonic measurement.

X-Rays—Responsibility here is control quality of welds, castings and bearings (copper, lead and bronze) in defense operations. Many highly-stressed components in jet engines are of welded construction. All fusion welds are checked for porosity, cracks and lack of penetration.

Bearings are inspected for segregation, porosity and lack of bond, castings for shrinkage, cracks, hot tears, blow holes and general porosity.

Radiography — The company uses this technique in the development of commercial casting procedures. Inspection shows location of shrinkage areas, hot tears and blow holes.

Information assists in mold venting, location and size of gates and risers and proper mold sand mixes and binders. Revision of techniques can assure sound products, moving shrinkage into gates and risers. If shrinkage can't be eliminated, it can be minimized with chills.

Magnetic Particle—Technique is required on all highly-stressed, ferromagnetic parts in the aircraft engine and tank engine programs—gears, shafting, cylinder barrels, masters rods, articulated and connecting rods, for example.

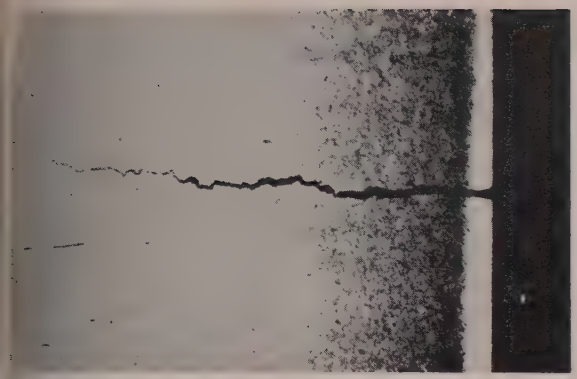
In this instance, rough material is a small part of the cost of the finished product. After rough turning, inspection weeds out defective material before expensive finishing operations are performed. If a lot shows a high rejection rate on a sample check, it can be rejected, saving even the rough machining costs.

Finished parts are inspected to remove defective components from the system. Defects created p process, or those not apparent first inspection, are caught he Most of them are caused by gri ing cracks, heat-treat cracks a inclusions.

Saving—In commercial prod tion, magnetic particle work i used on crankshafts, connecti rods, valve springs, front spind and other parts. Connecting r forgings formerly were inspec by pickling and visual inspecti Gain here has been about a 20 p cent saving in inspection cos plus a more positive indication defects. The disagreeable pi ling step also has been eliminat

Valve springs are magnet particle inspected by sample from each coil of wire. If sam springs are defective, the coil rejected.

Surface Temper—This is a w to check for abusive grinding. T principle is metallographic: M tensite in the as-quenched con tion is more resistant to att



s-quenched martensite shown on the left is brittle. adiography (right) is used to check casting methods

y an etchant. The greater the egree of tempering, the darker ie etch.

In grinding, heat is generated the interface of the wheel and ock and may cause over temper- ng of the surface or even rehard- aing—latter promotes grinding racks. As-quenched martensite s brittle; and an over tempered one directly beneath it does not ffer needed support. Cracks can evelop long after grinding, re- ulting in costly failures.

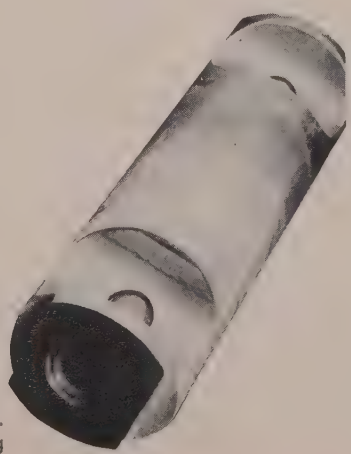
Aircraft engine division uses his test on hardened-steel, mov- ng parts that are highly stressed —steps are a dilute nitric acid tch, rinse and dilute hydrochloric cid dip to clarify the etch. Rinse nd neutralizer are often used in he grinding department. Payoff as been a considerable improve- ment in grinding techniques, selection of wheels and coolants. (It's possible high-speed steel cutting tools can be checked by this method to get better tool life, decrease downtime and regrinds.

Penetrants — Fluorescent penetrant inspection (and x-ray) is used to check welds in aircraft components. Cracks not always found by x-ray are often detected this way. Castings are checked for cold shuts, cracks and porosity. Steel-backed bearings can be inspected for the bond between the bearing metal and steel.

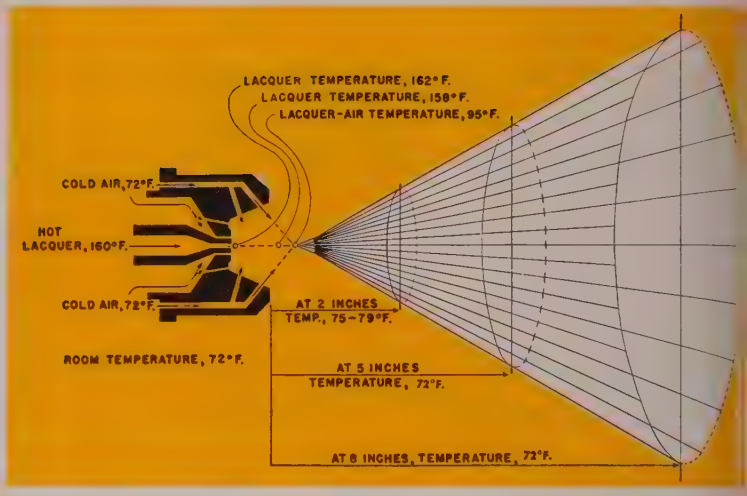
Method also is used on carbide-type cutting tools that are especially susceptible to cracking in grinding. A defective tool can chip out, ruin the part in the machine and cause a considerable loss of production.

Dye penetrant inspection is used where fluorescent penetrant facilities are not available or where localized areas are checked. In the tank engine program, dye inspection is used to insure complete removal of defects before repair welding (where permitted) on castings. Method costs little more than fluorescent penetrants but is limited in application.

Ultrasonics — Where other devices can't be used, this technique is relied upon to find metal thickness—for example, the uniformity of wall thickness of cylinder bores in cylinder blocks, uniformity of gage in steel sheet and (although not designed for this) it has been known to find evidence of laminations. Thickness of blast furnace air-blast pipe at turns has been checked for erosion.



Dye penetrant (left) is used to check localized areas. Surface temper (right) shows up any abusive grinding



In this sketch are shown the temperatures found during the spraying a hot lacquer (162° F) using room-temperature (72° F) air for atomization. It is evident that the lacquer as deposited on the target 8 inches from the gun was approximately at room temperature, which should greatly reduce chances of blushing during the application of the lacquer

You Can Do More with Hot Lacquer

Fewer coats are needed by hot-spraying improved formulations. Higher solid content accounts for better coverage. Lower viscosity is the result of heat, not increased solvents

"IF you're looking for a place to streamline costs, take a look at your finishing department," a Southwestern producer of bus bodies will tell you.

His plant was geared to one-body-a-day business until a star salesman came in with an order for 300. The joker was that they had to be ready for delivery by the beginning of the school year.

The sudden boon became a headache. To meet the tight schedule, eight bodies a day had to roll off the line. Space taken by baking ovens was needed for additional forming and assembly operations, but timing put building a new plant or expanding the old one on the impossible list. Closely-figured contract costs ruled out the rental of space. Economy measures were in order.

The way out was found in the finishing department. By switching to hot-spray lacquer, they found that one coat over the shop primer did the trick. Baking ovens weren't needed.

Others, Too — In the industry-wide trend toward closer costs, many manufacturers are showing new interest in lacquers.

Formulations have been improved at no sacrifice to traditional advantages of lacquer. New benefits include improved service life and outdoor durability, minimum orange peel and the elimination of humidity blushing.

Hot spraying, the relatively new application technique, minimizes two former objections—the number of coats needed to get adequate film thickness and manpower costs involved in rubbing operations.

Beauty of the hot-spray process is that lacquer is thinned by heat (from 150 to 160°F) instead of extra solvents; so solid content much higher—now 25 to 35 p cent, compared to the former to 20 per cent (percentagewis increases may range from 40 55 per cent). This means one h spray coat can approach the bui of two cold-spray coats. In fa only one topcoat is required f many military finishing syste

For Example—Starting with clean, bonderized steel, you c get a two-color finish (total fini thickness is 4 mils) in 45 minut Hercules Powder Co. outlines th schedule for nitrocellulose prim and lacquer:

Work is primed with MIL- 11414A to a thickness of ¾ m In 20 minutes, one coat of yell (MIL-L-7178, No. 505) is h sprayed to a thickness of 1½ mi Fifteen minutes later, the work masked with 3M tape and o coat of black (1¾ mils thick)

ORMULATION OF HOT LACQUER
MIL-L-7178

	% IN LACQUER
ile titanium dioxide	2.7
n blue	1.2
bon black	0.6
nitrocellulose ½-sec dry basis)	7.4
lolyn[R] 502	15.1
cresyl phosphate	3.0
anol	4.9
thyl isobutyl carbinol	9.1
lene	28.0
thyl amyl acetate	7.0
tyl cellosolve	7.0
thyl isobutyl ketone	14.0
Total	**100.0**
r cent pigment (by wt)	15.0
r cent total solids (by wt)	30.0
scosity range, No. 4 Ford cup, sec	70-100

e: This is a gloss for aircraft use. It was lified to a nonrubbing, high-glass formu- on for the bus bodies mentioned in the cle.

HOT-SPRAY UNITS—COMPARISON DATA

	MANUFACTURER					
	Arco	Beck	Bede	DeVilbiss	M & E	Svenska M.A.B. Greiff
Model	A. Heater at gun B. Heater in line	Dualheet	U-39	QBH-5001	A	Varmolack VLS-802 Therm-O-Spray SPC-1
Time to heat lacquer from 70° to 160° F	3 min.	45 min.	15 min.	15 min.	90 min.	20 min.
Lacquer holdup in unit and lines	1 ounce (heater only)	0.5 gal.	0.5 gal.	2.5 gal.	1.5 gal.	15 cc. (0.5 ounce) (heater only)
Temperature drop between heater unit and spray gun*	0*	10°F.	10°F.	10°F.	10°F.	0*
Air temperature for atomization	cold	160-180°F.	cold to 160°F.	cold	cold	180-300°F.
Heating medium	steam	electric, hot water	electric, metal casting	steam	electric, hot water	electric, hot air
Lacquer circulator	none	air-motor pump	air-motor pump	air-motor pump	electric-motor pump	none

*Length of fluid hose between heater and spray gun, 8 to 10 feet. Heater is attached to spray gun on the Arco and Varmolack units; therefore they do not show a temperature drop.

Addresses:
Arco Company, Cleveland Ohio.
Beck Equipment Co., Cleveland.
Bede Products, Inc., Cleveland.
DeVilbiss Co., Toledo.
M & E Manufacturing Co., Indianapolis
Svenska M. A. B. Greiff, Stockholm, Sweden (American distributor — Douglas Wilson and Company Inc., New York

Compiled by Hercules Powder Co.

t sprayed. At 45 minutes the pe is stripped, and the panel is ady for demonstration. Polish- g and rubbing are not required.

Such systems are being used in vilian and military applications. erformance data show salt-spray sistance up to 300 hours is not common; and the 18-month eathering requirements for Flor- a and the Washington, D. C., ea are met without checking, acking, embrittlement or loss of dhesion.

Accounting — Solid content of ot lacquer may approach or equal hat of competitive, nonlacquer nishes. For this reason, a gal- n of hot lacquer often costs more han an equal amount of room- emperature lacquer. Hot-lacquer avings come later in the game. Higher first costs are offset by avings in materials and applica- on.

Lower solvent content and less verspray account for material conomies. A typical hot lacquer ith 30 per cent solid content re- uires 2.33 pounds of volatile olvent to apply 1 pound of lac- uer solids. A room-temperature acquer with 21 per cent solid con- ent takes 3.76 pounds of solvent o do the same job.

By spraying at lower-than-nor- nal viscosities, less air pressure is needed to atomize the finish. This means less overspray.

Help Here—Since hot lacquer allows a thicker coat, a reduction in application costs results. Using two coats where three were once needed is a 33 per cent saving, for example.

Lacquers applied at room temperature are nearly always sanded, rubbed and polished. Better flow out of hot lacquer means that less time is spent on these expensive details. Users of hot lacquer report a 40 to 60-per-cent reduction of costs here.

Higher solids also give better coverage per gallon. A furniture company says it covers 408 sq ft with a gallon of hot lacquer. Same amount of varnish does 335 sq ft.

Formulation — Advantages of hot lacquer are not confined to nitrocellulose types. Lacquers based on such materials as ethyl cellulose, cellulose acetate, high-viscosity vinyl resins and Parlon also can be used.

The film forming or nonvolatile part of hot lacquers does not differ from its room-temperature counterpart. But solvent ingredients must be changed. To spray at 160°F, it is advisable to eliminate fast-evaporating solvents from the blend—such as acetone, ethyl acetate, methyl alcohol, etc.

Generally, pigments and dyes for room-temperature lacquers can be used. Some care must be taken to avoid highly reactive types—for example, acidic or alkaline pigments and dyes not heat stable.

Viscosity drop with heat has been found to be due chiefly to temperature. It does not seem to be the result of the improved solvency of a resin or plasticizer.

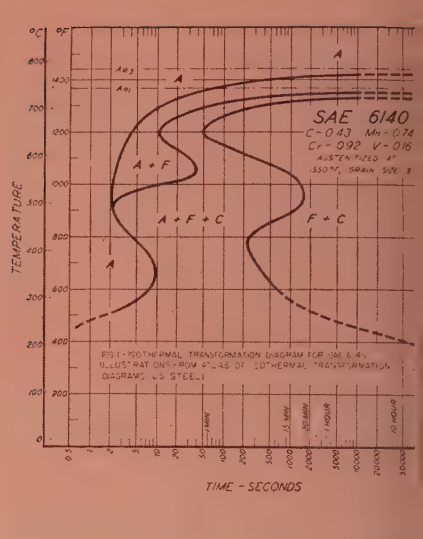
Application — In most cases, 160°F is recommended. Lacquers can be held at this temperature from 8 to 12 hours with no noticeable effect—and for several days without marked degradation of properties.

Temperature control is a big point. Every finisher has experienced the difference in spraying in winter (say at 60°F) and summer (about 90°F). With hot lacquers seasonal fluctuations do not have to be compensated for; and, in addition, there is the advantage of a constant high temperature.

Another point to consider is that lacquer applied at 160°F is at room temperature when sprayed on an object 8 inches from the gun —good flow characteristics result. Because of the refrigeration effect of atomization, room-temperature lacquers hit the surface being finished at about 20 degrees below room temperature.

No. 3 in STEEL's
MODERN HEAT TREATING SERIES

By NORBERT K. KOEBEL
Director of Research
Lindberg Engineering Co.
Chicago



FUNDAMENTALS OF QUENCHING — PART 3

Interrupted Quench

RAPID cooling of work to a selected temperature (called interrupted quenching) is used in three specialized operations — austempering, martempering and cyclic annealing.

Austempering offers medium hardness, ductility and toughness, plus good control of distortion; martempering provides high hardness equal to oil quenching, with greatly reduced distortion and practically no internal stresses; and cyclic annealing produces a soft and easily-controlled structure in a short time cycle.

Treatment is generally carried out by quenching from a salt bath or atmosphere austenitizing furnace into a salt bath which is held at a lower temperature. High-temperature quenching oil also may be used for austempering.

Basis — When steel is heated above the Ac3 or upper critical range, its structure goes over to austenite. Now suppose instead of cooling to room temperature (quenching), it is cooled to some elevated temperature, and then held there for a time.

The microscope can be used to study the time it takes the austenite to transform—from start to finish. By plotting results (per cent austenite vs. seconds) you get a curve that shows the transformation of steel at constant temperature.

Practice—Curve for SAE 6140 is shown in Fig. 1. These curves have been worked out for a number of steels and are often r ferred to as S curves (because their shape) or TTT curves (b cause they tell the story of tim temperature and transformation They also may be called I-T di grams, abbreviation for isotherm transformation.

The I-T diagram is a map. charts the transformation of au tenite as a function of temper ture and time, to permit appro mation of how the steel will r spond to any mode of cooling fro the austenite state. Fig. 2 sho relationship of quench - temp types of hardening treatment to typical I-T diagram.

Rules — Steels for isotherm heat treatment should have hig hardenability; sections to be trea

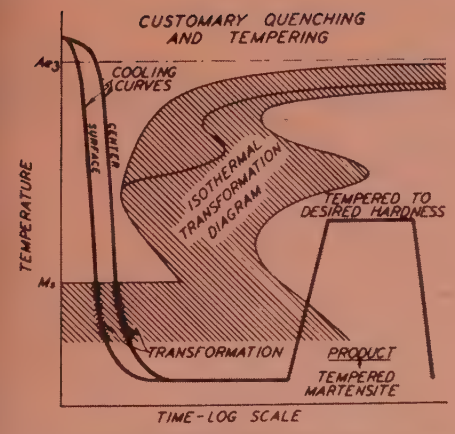


FIG. 2—RELATIONSHIP OF QUENCH AND TEMPER TYPE OF HARDENING TREATMENT TO A TYPICAL I-T DIAGRAM

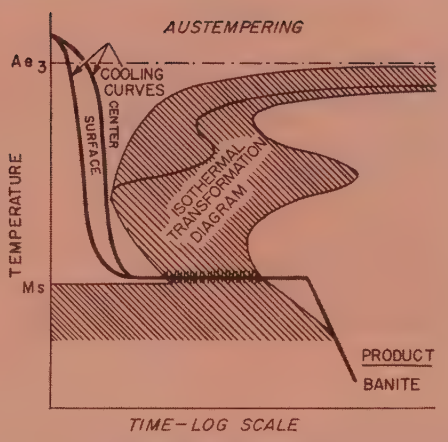


FIG. 3—RELATIONSHIP OF AUSTEMPERING TO I-T DIAGRAM

Gives Special Properties

In isothermal process, metal is heated to bring constituents into stable solution, then quenched at or above critical rate at constant elevated temperature, indicated by TTT curve

d should be light. Reason: They nust be cooled rapidly to get lown past the nose of the S curve it the upper extreme left within he seconds shown on the chart.

SAE 6140 (Fig. 1) has sufficient hardenability so the nose of the curve lies far enough to the right to make isothermal treatment practical on production parts.

Austempering—This is a hardening process based upon isothermal transformation of austenite to bainite. The I-T diagram, or at least its lower portion (Fig. 3), is almost indispensable for a guide.

Treatment is carried out by heating in a furnace or salt bath above the Ac3 range to austenitize; then quenching into hot salt held at a temperature just above the point where martensite begins to form (Ms). Referring to Fig. 1 the Ms temperature for SAE 6140 is 625°F.

Now, to austemper the steel, the salt bath is held at a constant temperature of about 675 to 750°F, depending on the Rockwell C hardness and properties wanted.

Example—Take a bath temperature of 700°F. The steel is held for 15 to 30 minutes. The diagram shows that the transformation is complete and Rc hardness is about 44.

Transformation product is bainite. It is hard but not brittle like martensite. If austempering is done properly, no further tempering is needed.

Austempered part is extremely tough compared to the equivalent hardness from conventional oil quenching and tempering of the martensite. Shovels and similar thin parts can almost be bent upon themselves without breaking.

Martempering — This treatment is not strictly isothermal. Steel is quenched into a bath at a temperature in the vicinity of the Ms; it is held until the center of the piece reaches bath temperature, then removed and allowed to cool in air.

Purpose of treatment is to slow down the formation of martensite to reduce danger of cracking or distortion due to stresses set up in hardening.

Factors—The outside of a part.

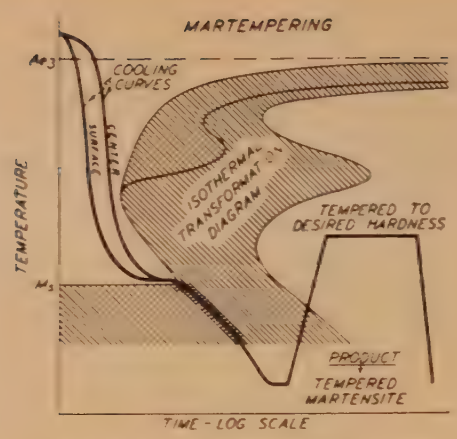


FIG.4—RELATIONSHIP OF MARTEMPERING TO TYPICAL I—T DIAGRAM

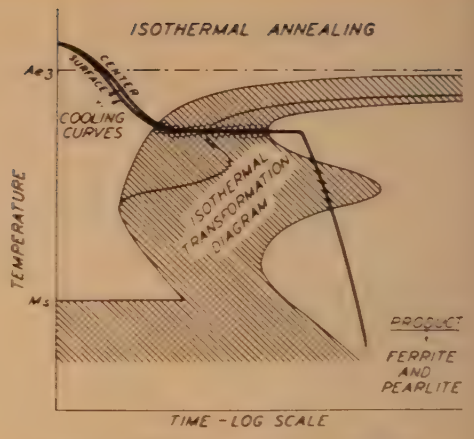


FIG.5—RELATIONSHIP OF ISOTHERMAL ANNEALING DIAGRAM TO I—T DIAGRAM

such as a steel bar, cools and hardens first. This causes it to contract at the surface while the inside is still plastic.

Also, as soon as the surface reaches the Ms temperature, martensite forms. This brings another factor into the picture—a volume increase. Stresses are set up because the transformation to martensite is causing the steel to expand while quenching is causing it to cool and contract. Besides this tug of war, there is differential hardening taking place in the center of the steel as it cools.

Value—Benefit of martempering is to hold back the martensite transformation until the work has a uniform temperature from surface to center. Martensite transformation is also slower when the steel is arrested at the temperature of the transformation. When parts are removed from the bath, the martensite transforms evenly. This avoids stresses that may cause cracking or distortion.

For complete hardening, austenite must cool fast enough to avoid transformation at the nose of the I-T diagram. Since it shows the Ms temperature, the I-T diagram (Fig. 4) is useful in selecting the optimum bath temperature for martempering and in estimating how long the steel may be held in the bath without forming bainite.

If held too long at the Ms point, some bainite will form; structure will be a mixture of bainite and martensite. This will increase the toughness with a loss in hardness.

Special — Since martensite is brittle, structure from martempering still needs tempering. But a lower tempering temperature must be used to end up with hardness normally obtained from a full martensitic structure.

This practice is often used in sections too heavy to austemper but where it is desired to increase the toughness. Example: Parts such as wrenches, sockets and fasteners where sections may go up to ¾ inch.

Here, too, if complete hardening is needed the austenite must cool fast enough to avoid transformation at the nose of the I-T diagram.

This cooling requires steel with good hardenability, such as an oil-hardening grade. Water-hardening type can't be used unless the sections are thin.

Isothermal Annealing—In many alloy steels, there is a pronounced minimum in the ending line of the I-T diagram at a relatively high temperature. Assuming, as is often the case, that the transformation product at this temperature is satisfactory, advantage may be taken of the time-temperature co-ordinates of this minimum to design a short annealing cycle.

As shown in Fig. 5, this is do by cooling the steel from the au tenitic state as rapidly as co venient to the temperature of th minimum in the ending line. It then held at about this temper ture for the time required transform austenite completel After this the steel may be coole in any available manner.

Take a look at Fig. 1 again, fo SAE 6140 steel. If it was heate to 1550°F to austenitize and the cooled fast as possible to 1200°F it would have to be held only abou 2 minutes to complete the trans formation of austenite to a fin pearlite and ferrite with hardnes of 26 Rc.

After the two-minute hold pe riod at 1200° F, the steel can b taken from the furnace and coole in air. This practice saves co siderable time in annealing of ce tain steels.

Specific applications for austempering, martempering and cyclic annealing will be taken up in a subsequent article in STEEL's Modern Heat Treating series. Next article (No. 4) on June 28 will discuss low temperature treatment.

PERHAPS YOU, TOO, CAN MAKE A BETTER PRODUCT WITH REVERE EXTRUDED SHAPES

This new Oxy-Acetylene welding torch is notable for the use of Revere Extruded Shapes in free-cutting brass—and also for its light weight, good balance, and easy handling. The connection for the gas tubes is machined from a shape, and silver-brazed to the fluted handle, also a shape, which is in turn brazed to a shape that contains the needle valve controls. Another fluted shape is the mixer, and the same shape is also the source of the next part, which is a second mixer. Another shape forms the nut which attaches the nozzle to the assembly. The nozzle, by the way, is made of Revere Free-Cutting Copper Rod, which is upset, drilled, swaged to size, and then chrome plated. The manufacturer of this new torch came to Revere to learn about the possibilities of extruded shapes.

If you have a product whose design includes a part or parts calling for extensive machining along the longitudinal axis, such as flutings, curves, recesses, remember Revere Extruded Shapes. They can greatly reduce machining time, lessen scrap, lower production costs, and speed up output. See the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

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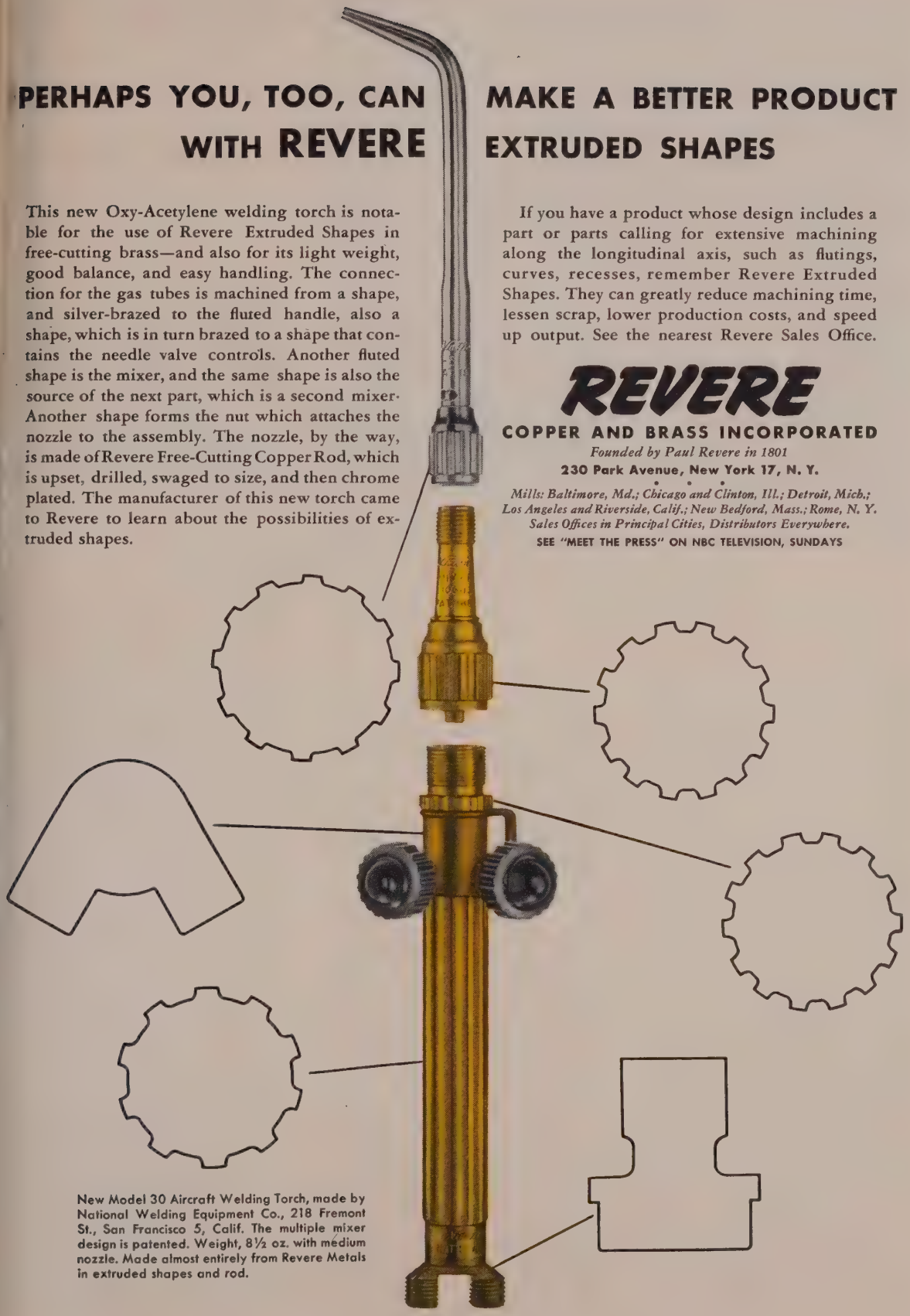
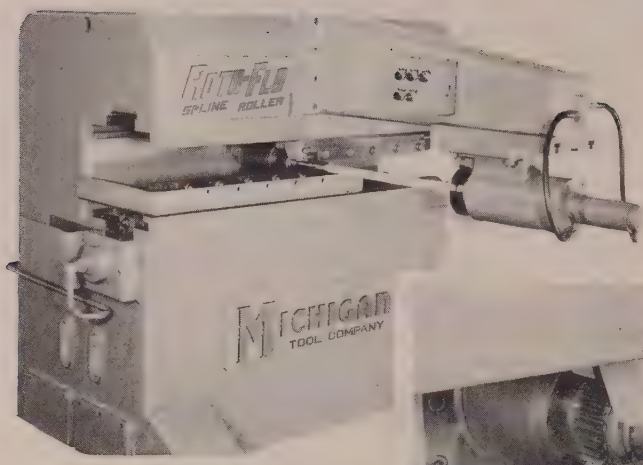
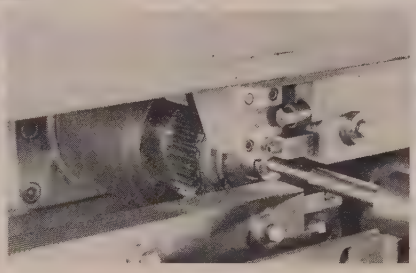


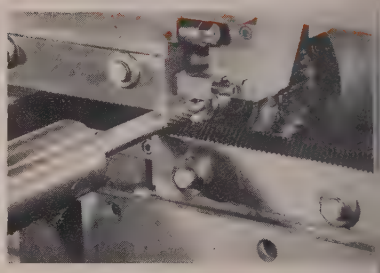
New Model 30 Aircraft Welding Torch, made by National Welding Equipment Co., 218 Fremont St., San Francisco 5, Calif. The multiple mixer design is patented. Weight, 8½ oz. with medium nozzle. Made almost entirely from Revere Metals in extruded shapes and rod.

SPLINE ROLLING . . .

New Process Makes it a 4-Second Operation







At left, forming racks are about to engage shaft OD; at right, helical splines are almost completed

In this cold-working process, metal shaft is placed between forming racks and emerges with teeth completely formed at any position. Downtime for rack change: 15 minutes

A BASIC new process for producing splines, oil grooves, serrations and other similar shapes on external parts is announced by Michigan Tool Co., Detroit. Machines to implement the process, to be known as Roto-Flo spline rollers, are being made in three sizes from 24 to 50 inches.

Rolling splines or similar shapes on Roto-Flo machines is a cold working process in which the metal shaft is placed between the forming racks and emerges in a few seconds with teeth completely formed at any desired position along the shaft. Resulting splines have a high degree of accuracy, with excellent surface finish. Since metal is displaced and not removed, parts usually are made to the pitch diameter before forming.

Design Advantages—Early tests show parts produced with rolled splines will withstand high torsion loads. Increased load capacity should allow designers to take advantage of finer splines.

Another example of design flexibility of this forming process: Teeth have been formed all the way up to a protruding shoulder diameter. Because a recess for tool clearance adjacent to the shoulder is not required, and the shoulder is not damaged in any way, greater strength and better bearing surfaces are obtained.

Production Time — Another essential factor is savings in production time. On one test, splined axle shafts 1⅛ inch in diameter and 1¼ inch long were formed in about 4 seconds. Depth of cut was 0.080 inch. The same job took 2 minutes, 38 seconds with a hobber.

Parts on the test were rolled from SAE 1037 steel, ranging in hardness from annealed to 41 Rockwell C. Finish obtained was 3 to 6 microinches; accuracy was within 0.0008 inch variation from part to part.

Components — Basic components of the Roto-Flo machine, in addition to the rack-type forming tools, are two slides and an extremely heavy C-shaped machine frame. The two slides, holding the forming racks, are mounted one above the other. Slides are geared together with master racks (not the tool racks) and a connecting gear. Lower rack is the prime mover and gains its power from hydraulic cylinders.

Tool racks are adjustable toward the part center to obtain proper size, are also adjustable endwise to gain correct relationship with the part axis. Racks can be set within a few thousandths initially, adjusted with the wedge mounting to size quickly. Probable downtime to change racks is 15 minutes —after perhaps 500,000 parts.

A small serration is used at the start of the rack to rotate the piece initially. Piece is supported with a center and a yoke. Racks up to 50 inches long will be made at the firm's Manistee Iron Works.

Tool Life—High tool life is anticipated since all stresses are compressive and not in shear. Racks are made of high carbon, high chrome steel. Teeth are ground on a special machine designed to produce extreme accuracy in spacing pressure angle, helix, etc.

An automatic coolant system cools forming racks and splines under mass production conditions. Safety interlock system will not permit forming racks to return until workpiece is removed.

(Advertisement)

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the prefiring of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

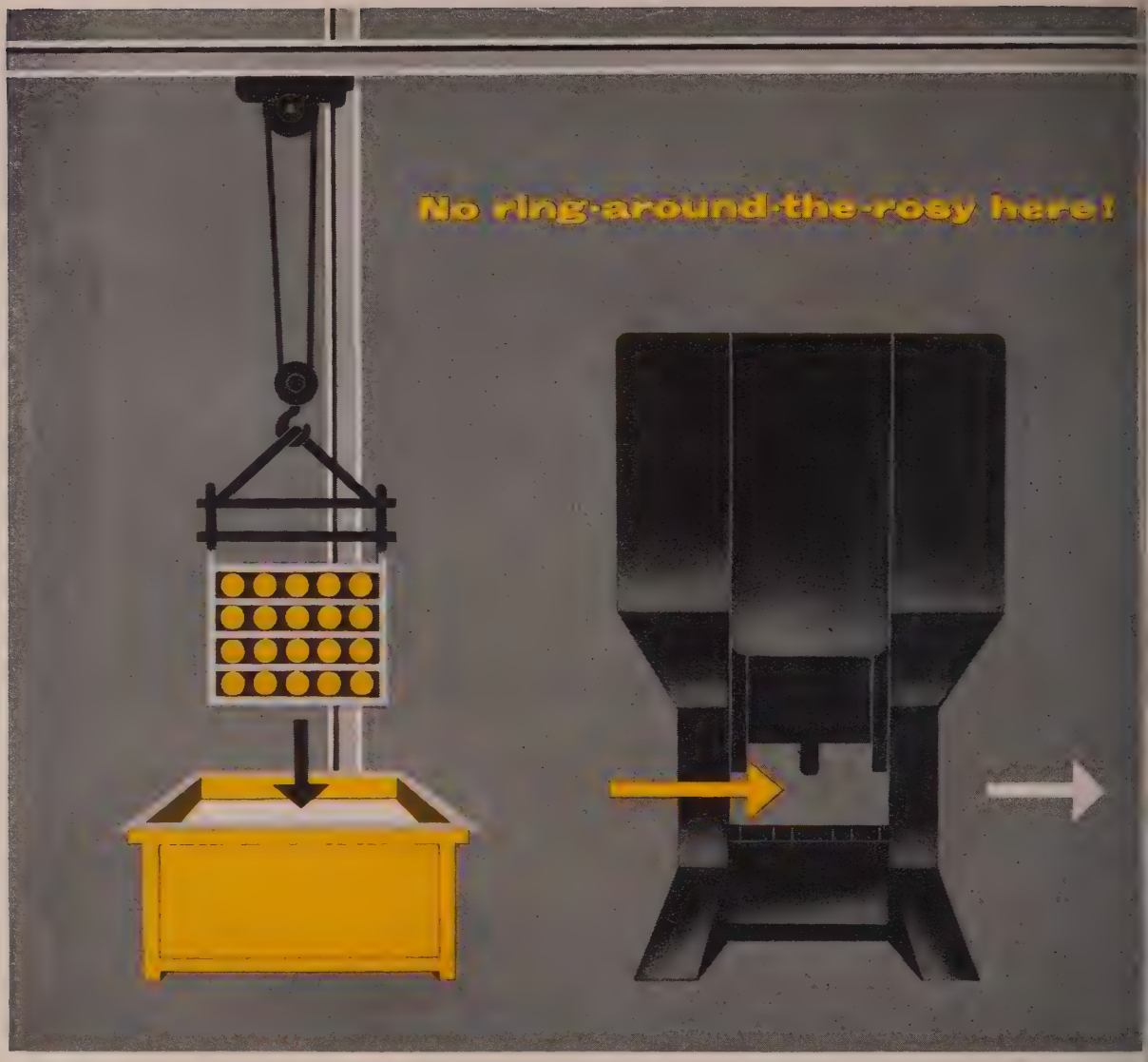
A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.



With the new Pennsalt Fos Process, cold steel can be extruded into finished shapes . . . directly . . . with important economies in manufacturing. Cold steel discs or billets are formed into shafts, cylinders, tubes, gear blanks and many other parts in the press. This eliminates up to 80% of all machining . . . creates a direct line manufacturing system that lowers costs and improves production.

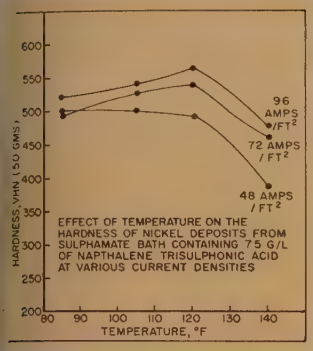
The Pennsalt Fos Process is now being used in automotive, tube, wire drawing and ordnance plants. The process includes a new Pennsalt lubricant and a proven method of locking that lubricant to the steel. The Fos Process insures the smooth and rapid flow of cold steel through the die, even at extreme pressures.

Practically all the original metal can be utilized with Pennsalt cold extrusion techniques . . . work cycles can be reduced . . . and over-all production speeded up. Superior physicals can be obtained from carbon steels, along with a better, smoother finish. Multiple draws without interim recoating and annealing, and greater reductions per draw are now practical.

Is Fos Process practical for your plant . . . your products? Send us details of desired application, or blueprints of products. We will be glad to evaluate possibilities. Customer Service Department, 530 Widener Building, Philadelphia 7, Pa.

Pennsalt Chemicals

THE PENNSYLVANIA SALT MANUFACTURING COMPANY



EFFECT OF TEMPERATURE ON THE HARDNESS OF NICKEL DEPOSITS FROM SULPHAMATE BATH CONTAINING 7.5 G/L OF NAPTHALENE TRISULPHONIC ACID AT VARIOUS CURRENT DENSITIES

SPECIAL PROPERTY NICKEL PLATE

Low tensile and compressive stress characteristics, hardness and wear resistance of the sulphamate nickel deposit are valuable properties in engineering applications

NICKEL SULPHAMATE BATHS

	Bath No. 1		Bath No. 2†	
	oz./gal.	g./l.	oz./gal.	g./l.
Nickel sulphamate	40	300	40	300
Nickel chloride	4	30	4	30
Boric acid	4	30	4	30
Naphthalene 1, 3, 6-trisulphonic acid	..	..	1.0	7.5

†Patents applied for.

IF YOU NEED a nickel plate with special properties, take a look at what the nickel sulphamate plating bath has to offer.

Applications are chiefly in the engineering field: The resizing of worn or mis-machined parts, heavy coatings for various purposes and electroforming. Hardness of the plate approaches 600 VHN. Aviation devices requiring definite electrical resistivity properties may be electroformed.

Hardness of the deposit, low internal stresses and lack of abnormal brittleness are properties that make the bath stand out, Dr. Myron B. Diggin, Hanson - Van Winkle-Munning Co., told the recent Fourth International Conference on Electrodeposition and Metal Finishing in London, recently.

Baths Used—Two baths are being studied in the Hanson-Van Winkle-Munning laboratories (see box). Basic composition of both solutions is nickel sulphamate, nickel chloride and boric acid. One uses 3 to 11 g/l of naphthalene 1, 3, 6-trisulphonic acid as addition agent.

Dr. Diggin stated this addition agent has a marked effect upon the properties of the nickel deposit. It increases hardness, creates an internal compressive (not tensile) stress, increases the tensile strength and electrical resistivity.

Other Constituents—Nickel sulphamate furnishes nickel ions to the solution and may be varied between 36 and 44 oz. per gal. The higher the concentrations of nickel, the faster the plating rate that may be used. Nickel chloride promotes anode corrosion as it does with other nickel baths. It helps maintain the nickel content at a satisfactory level and also minimizes any harmful oxidizing effects at the anodes. Boric acid gives its usual buffering action in the cathode film.

Normal operating conditions for the bath: Temperature, 75 to 160° F; current density, 20 to 140 amp per sq ft; pH, 3.5 to 4.2, electometric; agitation, air from a low pressure blower; filtration, continuous.

Build-up—In salvage operations on tools, crankshafts, diesel cylinder liners, etc., nickel is plated to thicknesses as high as 0.030 to 0.050 inch. The hard nickel plate may be used for the entire build-up or for a large portion of build-up followed by chromium.

Electroforming, which involves plating on matrices or patterns, is an important application. The low tensile and compressive stress characteristics of the deposit, hardness and wear resistance are favorable here.

The sulphamate process is used in reproducing geometric surface roughness standards by electroforming. Other applications include leather embossing dies, and electroforming of various types of tubing such as radar plumbing.

Fatigue Critical—Deposits from the bath containing the H-V-W-M addition agent find application on aircraft parts where fatigue values are critical and an initial soft coating with a hard case is beneficial. For some applications, a low compressive stress is essential on parts subjected in service to high impact—deposits with tensile stress would fail quickly.

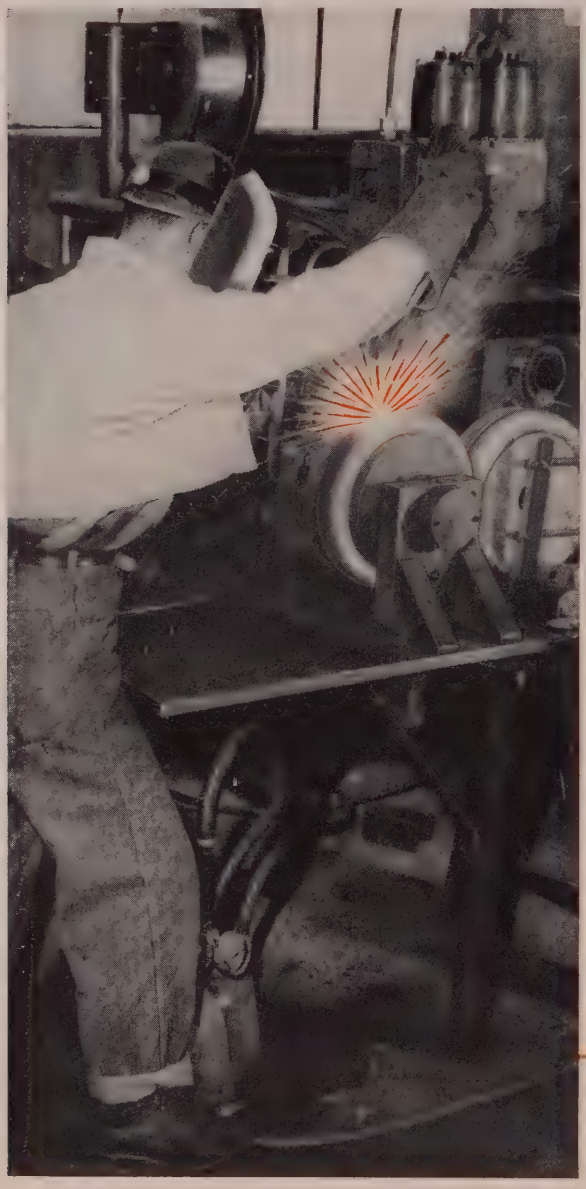
Additives which increase hardness also increase electrical resistivity. In one military electroforming application, deposits with high electrical resistance were required. By using a combination of cobalt and organic addition agent in the bath, the resistivity was increased almost two-fold to the range desired.

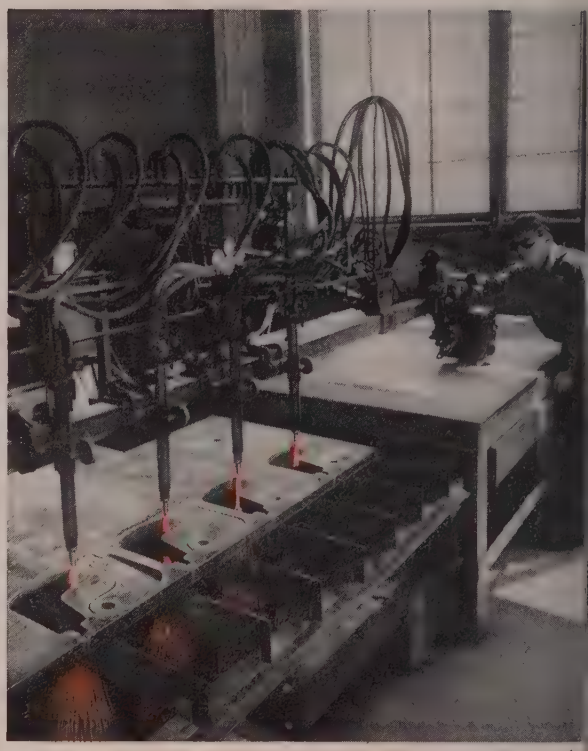
Balance—Tensile strength measurements of the sulphamate deposit, with and without napthalene trisulphonic acid addition agent, show that the additive increases the tensile strength considerably and decreases the elongation. With sound deposits, a parallel exists between hardness and tensile strength of nickel deposits; as the hardness of deposit increases, the tensile strength also increases, and elongation decreases.

This relation between hardness, tensile strength and elongation is of value. By determining the hardness of the deposit, a prediction can be made about the other two properties.

Delivering industrial "breath"—Oxygen supply and servicing is as important as its unit price and purity. Airco customers get a dependable, flexible supply service from a network of 70 producing plants situated strategically throughout the country. Delivery, by bulk truck (far right), in cylinders, or by direct pipeline is quick and dependable. Right: valve opening ceremony last year at the new Airco liquid oxygen plant, Butler, Pa. These pipelines deliver oxygen to Armco Steel and Pullman Standard steel plants.

New welding process speeds production — Among industry's newest production tools is the Aircomatic® process. The method greatly increases the speed with which good welds can be made in a wide variety of metals and alloys, including "problem" materials like aluminum and stainless steel. This photograph shows the inert-gas-shielded metal arc of an automatic Aircomatic head welding truck-trailer dolly wheels from press-stamped SAE 1020 steel at Youngstown Steel Car Corp., Niles, Ohio. Oxygen plays an important part here as an additive to the shielding gas.



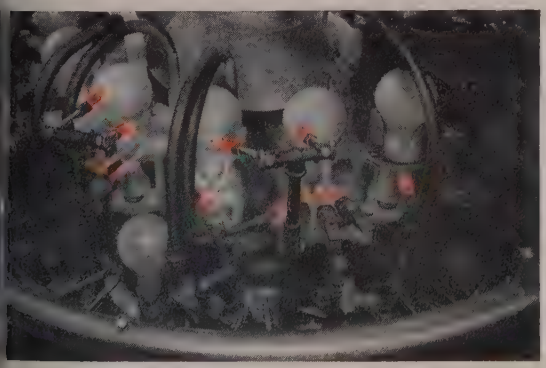


Most dramatic use of oxygen — Flame cutting is perhaps th most spectacular industrial application of oxygen ... as usef as it is striking. The oxygen-acetylene flame used generat 6300°F-heat. This temperature permits cutting metal thic nesses ranging from sheet to heavy ingots. Here, an operat at Brown-Wales Co., New England steel warehousing firr cuts steel plate with an Oxygraph equipped with Electron Tracer, one of the Airco precision machines that has broug flame cutting to a peak of usefulness.

AIRCO

Airco Oxygen Tent for Industry

ıe vital importance of oxygen to industry is rela- ely new. Forty years ago, the market for oxygen cutting and welding and allied uses was virtually nexistent. The rapid growth of industrial oxygen ısumption has been nourished by three conditions: expanding economy, the wider use of *any* effective product in healthy conditions of economic expansion, and the development of new and improved tools and techniques whose effectiveness depends on oxygen. For details of these and other applications of Airco products, write for a sample copy of the magazine, "Airco in the News."



xygen in the glass industry — Insatiable demand for ght bulbs, electronic tubes, and similar glass components ıs brought modern mass production methods to the old t of the glass blower. This "sealing-in" machine at Syl- ınia Electric Products, Inc. seals bulbs and mounts into 50-watt inside frosted incandescent lamps at a 1500-per- ur rate. A mixture of oxygen-enriched air and natural ıs provides the right flame shape and temperature in the ts that soften the throats of the bulbs prior to sealing.

Needling steel for production economy—Oxygen has replaced iron ore as an oxidizing agent in most steel mills with electric furnaces. Here at Mid-Continent Steel Castings, Shreveport, La., a long pipe injects the oxygen directly into the molten steel. Advantages of this Airco-pioneered process are savings in time, power, furnace electrodes and valuable alloy elements. Other oxygen applications include flame cutting of heavy scrap, scarfing, flame cleaning, oxyacetylene welding, dehydrating, hardfacing, and gas hot topping of ingots.

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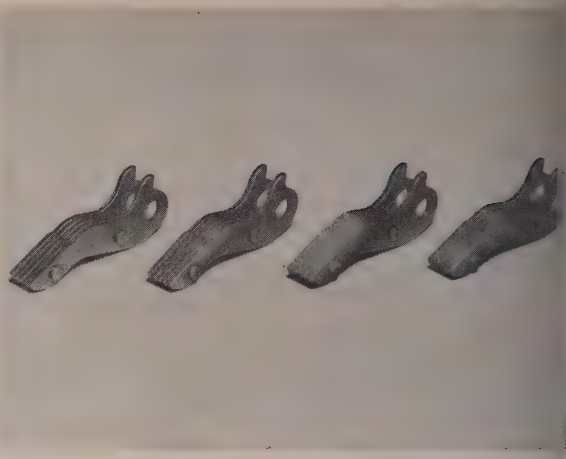
Deposited alloy fused to rocker arm surface to produce fusion-bonded, non-porous, wearproof surface



Rocker arm assembly, from left to right, as grit blasted with the alloy spray on, and as fused

ROCKER ARMS . . .

Wearproofed in Quantity

Nickel base hardfacing alloy, in powder form, is sprayed on metal surface, then fused to base metal for wear-proof surface at a rate of 2000 per 8-hour shift

AUTOMOTIVE engine fuel pump rocker arms are being wearproofed in mass production quantities with a spraywelded Colmonoy nickel-base alloy coating at Diamonds & Tools Inc., Detroit. The rocker arms are riveted laminated assemblies of SAE 1060 steel stampings.

Why Wearproof — Wearproofing of rocker arm surfaces that bear on a cam on a cast iron camshaft is specified to prevent excessive wear encountered on rocker arms with galling failure of camshafts in engines having heavy duty fuel pumps with vacuum boosters.

Rocker arm assemblies are first grit blasted with No. G-18 steel grit in a conventional grit blasting machine. Several rocker arms are assembled on a rod fixture for this operation. The grit blasted surface provides the necessary mechanical bond between base metal and the subsequently sprayed-on alloy.

Following the grit blasting operation, the rocker arms are assembled on 3½-foot-long rods. This assembly is placed in the spraying stand. The Spraywelder unit with which the alloy is applied includes a pistol, powder hopper, carburetor, air filter and hose connections to oxy-acetylene and the factory air supply. Unit is mounted on a pedestal base adjacent to the spraying stand.

To Apply Alloy—Operator ignites the pistol, adjusts the controls to feed the powdered alloy and then directs the spray steam back and forth across the rocker arm assemblies until the required coating of 0.025-inch thickness is built upon the surface.

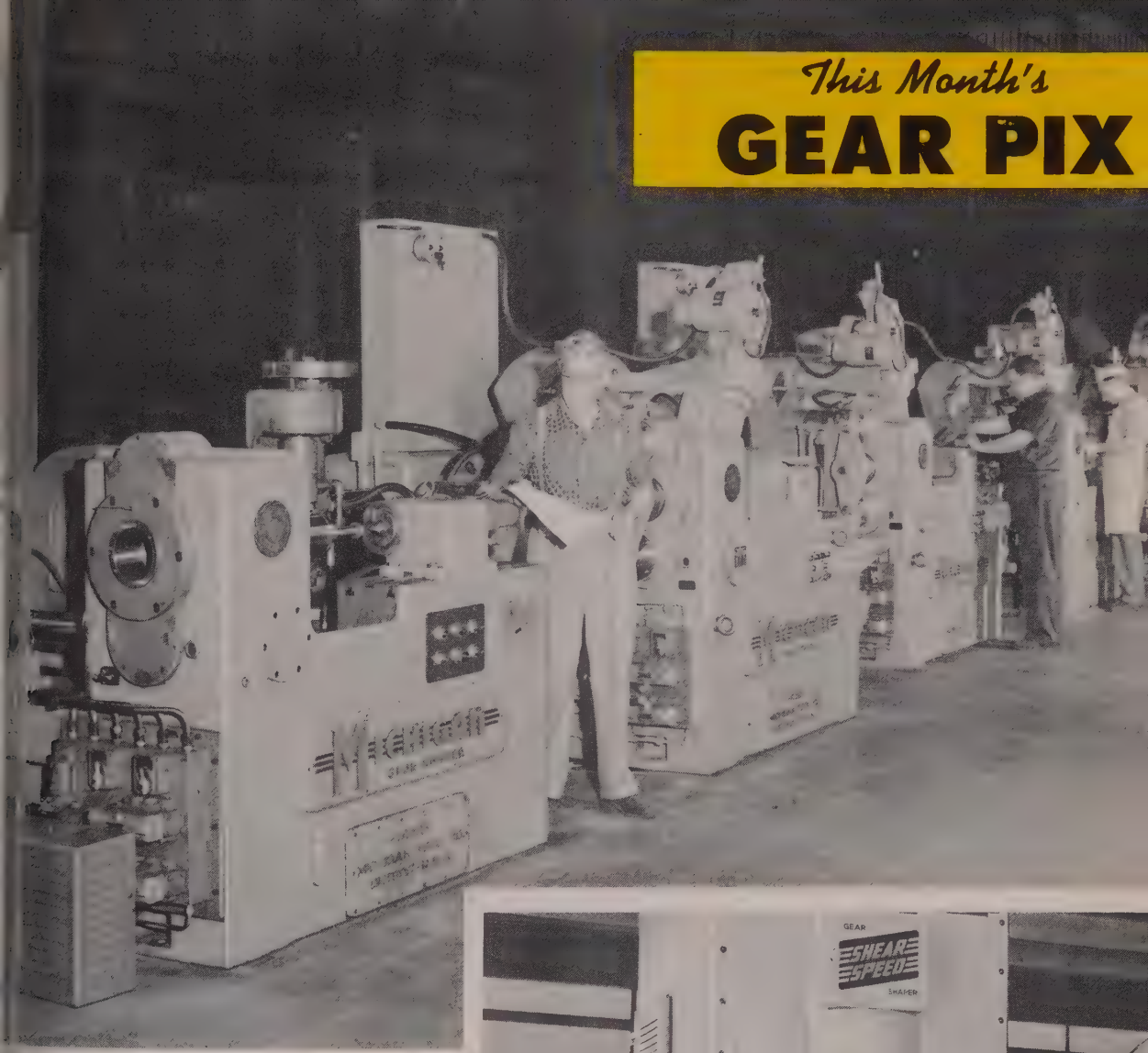
Next the rocker arms on the rod fixtures are placed on the fusing stand. The deposited alloy is heated to approximately 1900° F and fused to the base metal with a multiflame oxy-acetylene torch. Finish fused alloy deposit is about 0.015 inch thick at the middle and 0.007 inch thick at the edges. More than 2000 rocker arms are wearproofed in an eight hour shift on this process.

Properties of Surface—The Colmonoy No. 6 alloy applied to the rocker arm contains chromium, nickel and boron. It has a Rockwell C hardness of from 56 to 6[illegible], a specific gravity of 7.80 and a melting range of 1900° F and 210[illegible] F. The surface is said to have excellent abrasion and galling resistance, good impact resistance and a low friction coefficient—four properties that led to its specification for this application.

Excellent corrosion resistance, red hardness and weldability are reported. Non-magnetic, it can be ground or machined with a carbide tool. In addition to being available in powdered form, the alloy is available as bare rods for torch welding or coated electrodes as well as in cast forms that can be utilized as wear parts in machine components.

This Month's

GEAR PIX



HIGH SPEED HOBBERS—Michigan Tool's improved 1458-A Ultra-Speed gear hobbers are being used in ever increasing numbers in the gear industry. This battery of Ultra-Speed hobbers being assembled are the fastest single spindle hobbers made today.

COARSE PITCH GEARS—A typical 3½ pitch 10-inch diameter gear with a 1⅞ inch face width is cut on this heavy duty SHEAR-SPEED® gear shaper in less than 3½ minutes. Over five pounds of chips are removed in the process.

MICHIGAN TOOL COMPANY

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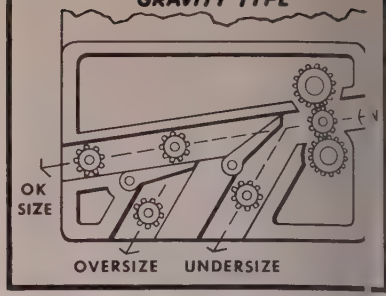
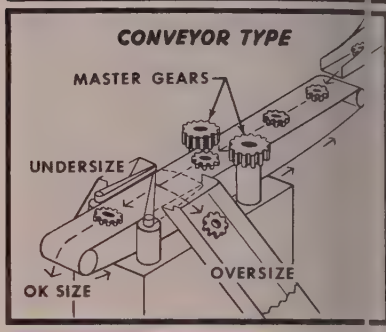
This Month's

GEAR PIX

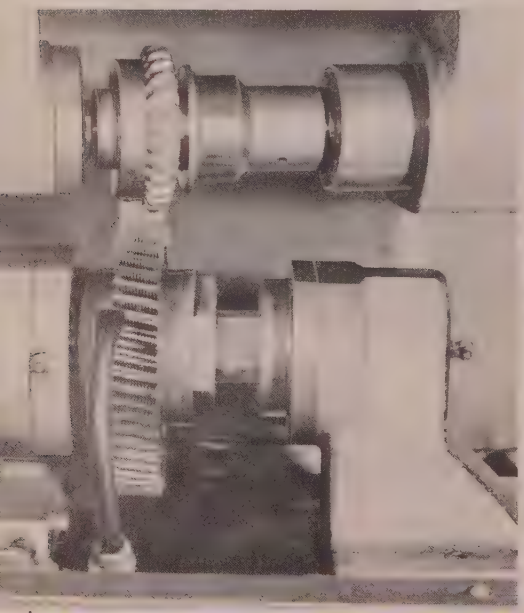




GEAR SELECTORS –Gravity and conveyor-type systems, custom made for size-checking of gears, are available in the new automatic 3-WAY gear selector. Automatic shut-offs can be incorporated into selectors located in a production line with full automation or one in which the operator feeds the gears manually. 3-WAY selectors can be used to inspect any spur or helical gear at a much more rapid rate than gear cutting or finishing machines can turn out gears.

ANNOUNCING –The SINE-LINE® model 1136 involute checker capable of handling large external and internal spur or helical gears up to 36-inch diameter, with a maximum spread between centers of 26 inches, has been added to the Michigan line of checking equipment. This checker may also be used to check tooth spacing. Checking principle is based on a single master disc, combined with a sine bar. No extra base forms or master base circle discs are required.

STEP SHAVING –Alternately thick and thin steps on the tooth faces of this splined main drive shaft are shaved in a two minute cycle on a Michigan 900 rack type gear finisher. A master rack, offset relative to the shaving rack, guides the master helical gear mounted on the work arbor, in progressively removing 8 to 12 thousandths of metal to form steps in the face of the spline teeth.



MODIFIED UNDERPASS SHAVING
Modified underpass method shaves this tough steel sliding low and reverse gear in 30 seconds. A Michigan 870 Underpass gear finisher easily handles 120 of the 3.833″ O.D. and 0.735″ face width gears every hour.

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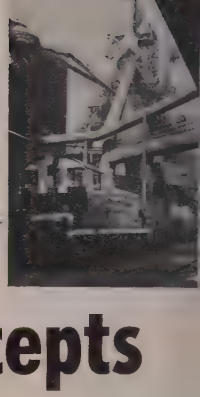
PART 2



Correlating Blast Furnace Operating Concepts

Amount of blast temperature carried on a furnace depends upon relationship between burden preparation and smelting capacity, if orderly operation is to be maintained

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operati
Cleveland

TECHNICAL science research has disclosed numerous chemical and physical properties of air. Under given conditions reaction of these properties will be constant. Because of the major position air occupies as a blast furnace raw material and the varied and variable effects which the several properties create in each of the categorical divisions of furnace reactions, namely, chemical, thermal and mechanical, it would be difficult to overstress their importance to blast furnace operating economy.

Pure air never exists in a natural state because natural air will always contain a fractional percentage of carbon dioxide (CO_2) and a variable content of wat vapor (H_2O). For blast furna operation the air properties of i portance may be said to be:

1. Chemical composition (dry by weight, 23.15 per cent ox gen and 76.85 per cent nitr gen; by volume, 20.91 per ce oxygen and 79.09 per cent trogen. (Average results several determinations—Hen el's Gas Analysis.)
2. Ability of air to carry wat vapor varies with its temper ture and pressure.
3. Weight of a given volume dry air varies with its temper ture and density.

TABLE 2—EFFECTS OF WATER DISSOCIATION ON COKE CONSUMPTION

Dissociation 1 lb water, Btu	5781
Heat potential/lb C, Btu	4370
Lb C/lb water (5781 ÷ 4370)	1.3228
1 lb water/lb O	0.8889
Lb C consumed (0.8889 lb O_2 × 0.75 lb C)	0.6666
Lb coke C consumed by primary combustion reaction	1.3228
Lb coke C consumed by secondary combustion reaction	0.6666
Lb coke C consumed by dual combustion reaction	1.9894
Btu potential (1.9894 lb C × 4370 Btu/lb C)	8694
Btu consumed in dissociation 1 lb water	5781
Btu available for furnace work	2913
Btu available/lb C burned (2913 ÷ 1.9894)	1464
Efficiency (1464 ÷ 4370), %	33.50
Loss of potential, %	66.50
Lb coke consumed/lb water dissociation (1.9894 ÷ 89.00 % F.C. in coke)	2.23

Foregoing calculation is based upon the following technical science research data:

1. Coke carbon burned at tuyeres is first converted to CO_2—an exothermic reaction generating 14,580 Btu/lb C.
2. In the presence of incandescent carbon, CO_2 immediately reverts to CO, an endothermic reaction which consumes 10,210 Btu/lb C, thus leaving 4370 Btu/lb C available for furnace work.
3. With the ultimate formation of CO from the dual combustion reaction, 1 lb O will consume 0.75-lb C.
4. Based upon atomic weights, water vapor is 11.11% H and 88.89% O.

Air Efficiency — Since air ox gen is the active agent for co carbon combustion it is readily a parent from the foregoing da that air as a blast furnace r material is at best only 23.15 p cent efficient in capacity to p form the chemical work it is s signed to do. However, becau of the complexity of thermal quirements and effects which co stitutes blast furnace operati effective use of heat is just as sential as efficient generation of

Because of the necessity maintaining equilibrium betwe

e rates of heat generation, distribution and consumption, as determined by the requirements of associated reactions of furnace peration, and effected through e mechanical action of gas dissal through the stock column, e general efficiency of natural r as a raw material is greater an its apparent efficiency as indicated by chemical composition.

Basic Points—Technical science search has disclosed the ultimate products from combustion of oke carbon and dry air at the rnace tuyeres will be carbon onoxide and nitrogen. Therefore, based upon atomic weights oxygen 16, carbon 12), one ound of oxygen will always consume 0.75 pound of carbon. Since ne weight of a given volume of ir varies with its density and ensity varies with temperature nd pressure, the weight of oxygen hich can be delivered to the uyeres with a fixed volume of atural air will vary as atmospheric pressure and temperature aries at the air intake of the lowing equipment.

Fluctuation in atmospheric temperature is inevitable, to a major legree with seasonal change and o a minor degree with daily or nourly change; so many practical cience operators have adopted he practice of "temperature blowng" whereby a base air volume s established for a base temperature (example 32°F) while the actual volume blown is increased or decreased at rates commensurate with the laws of physics as atmospheric temperature varies from the base temperature.

Through this means a reasonably constant weight of oxygen can be delivered to the tuyeres regardless of change in atmospheric temperature. Also with the means described, a change in atmospheric air volume taken in at the blowing equipment air intake does not change the air volume delivered to the tuyeres because that volume and velocity is determined by the temperature and pressure of the air as it leaves the bustle pipe.

Water Vapor in Blast Air—Probably no phase of heat generation deserves closer study than the effects from water vapor contained in blast air. Who first conceived the probability of the ill effects from it is not known. James Gayley[6] was the first to demonstrate (1904) a practical means for removing moisture from natural air for a full scale furnace operation.

Although a few plants have had beneficial results from use of dry air, the majority who have tried it have not benefited. A half century has elapsed since Gayley's initial demonstration, but the possible benefit from use of dry air is still controversial among furnace men. Probably it was so before his demonstration. Clearly, here is a condition of confused thought which requires a review of available particulars with careful discrimination.

Temperature Varies — Technical science research has disclosed that the saturation point of air and water vapor varies with temperature and pressure. Since atmospheric pressure at virtually all geographical locations where blast furnace operation is conducted does not vary greatly from the maximum (sea-level, 14.6963 lbs/psi), change in temperature is the principal factor governing natural water vapor content in blast air.

Variation in water vapor content of atmospheric air at different localities is recorded as "relative humidity" in government weather bureau reports published in daily newspapers. For such information to be of greatest value to the blast furnace operator the content should be determined at, or near, the blowing equipment air intake and recorded as grains of water vapor (H_2O) per cubic foot of air. Where such records are kept they indicate a representative range of content from 1 to 2 grains minimum per cubic foot of air in cold winter months to 7 to 8 grains maximum in hot summer months.

[6] A.I.M.E. *Transactions*, 1905.

TABLE 3—EFFECTS OF WATER VAPOR

	South[1]	North[2]	East[3]
Volume of air blast calculated from:			
Blowing equipment, rpm (dry), cfm	41,000	48,970	35,000
Gas analyses and coke carbon combustion:			
(Dry), cfm	28,691	34,585	30,194
(Wet), cfm	29,012	34,936	30,500
Water vapor, grains H_2O/cu ft air	3.73	5.49	5.49
Iron production:			
Per 24 hours, gt	324.7	572.0	715.0
Per minute, gt	0.225	0.397	0.496
Minutes/gt	4.43	2.52	2.01
Lb water:			
Per minute	15.46	27.40	23.70
Per gt iron	67.92	69.00	47.60

[1] Blowing engines. [2] Probably blowing engines. [3] Turboblower.

Since 7000 grains equal 1 pound, the grains of H_2O per cubic foot of air times the cubic feet of air blown gives the pounds of H_2O which are charged into the furnace with blast air in a given unit of time or per unit of iron produced.

Erroneous Practice—An interesting sidelight on the subject may be cited in the blowing practice which was virtually universal for many years where the air intake was located at the top of the blowing engine and just under the engine house roof—a location which was extremely hot and humid the year round. Following the disclosure of effects of water vapor on thermal requirements within the furnace by technical science research, air ducts were installed at many of the old plants through which air could be drawn from outside the blowing engine room.

Because of the temperature which exists in the tuyere zone of any blast furnace, and well up into the furnace, the compound H_2O cannot exist since it is immediately dissociated into its component gaseous parts—hydrogen and oxygen—an endothermic reaction. Competent authorities differ slightly in their calculation of the amount of heat consumed for the reaction but 5781 Btu per pound of compound (H_2O) is a representative average of their findings.

However, where the oxygen released through dissociation immediately unites with incandescent coke carbon and thereby generates heat, the same as oxygen which has been delivered with dry

Here's a Life-Line "A" stator that has been given multiple dips and bakes of Bondite. There is no evidence of vapor penetration after being exposed to the toughest insulation test—a jet of steam.

Try tearing a piece of Life-Line's slot insulation, Mylar*. Mechanical strength is eight times greater than ordinary slot cells. Dielectric strength is ten times greater than standard design requirements.

*Trade Mark for DuPont polyester film

'here's more to motor nsulation than its ability to repel water

These demonstrations show how new *Life-Line A* insulating materials provide greater protection for wire, slots and complete stator.

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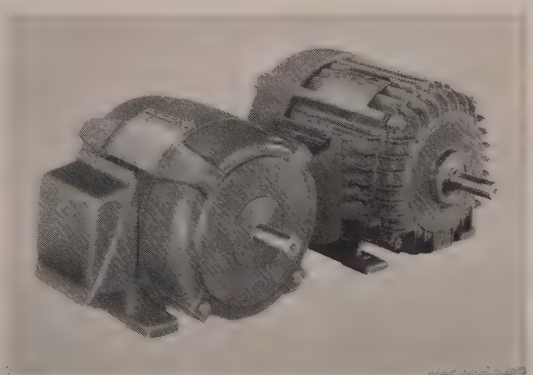
duck's ability to shed water is only feather deep. A mple wetting agent dissolves the duck's protective coating id he sinks. Many water-shedding motor insulations act much the same; expose them to a simple solvent and ey deteriorate.

ese two coils have been baked for 50 hours at 0° F. Bent around a finger, the ordinary insula- n on the right coil flaked off. Life-Line's Bondar sulation on the left remained intact.



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UNION METAL
Material Handling Equipment

air, the net amount of heat consumed per pound of H_2O is only 2868 Btu.

A Pitfall—But therein lies a pitfall for misconception of effects because the indicated reduction in Btu consumption is not caused by any lessening in the amount of heat required for effecting the primary dissociation reaction but by the generation of heat from the secondary combustion reaction between coke carbon and the oxygen which is released by the primary dissociation reaction.

In the interest of blast furnace thermal economy the important consideration is the amount of heat which is available for furnace work from coke carbon combustion and the weight of coke which is consumed to generate it. The degree of adverse thermal effect from H_2O dissociation may be calculated as shown in Table II.

For Example—A furnace blowing 90,000 cfm of air, with the water in the air of 5 grains/cu ft (average), and with iron production at 1 nt/min (1440 nt/24 hr) would dissociate 64.28 lb water/nt pig and would consume heat to an amount equivalent to the potential from 144.34 lb of 89.00 per cent fixed carbon coke. Cost of coke delivered at the furnace varies with plant location, currently $10 to $20 per net ton ($0.50 to $1.00 per 100 pounds) is representative. At these figures the monetary cost of H_2O dissociation is an appreciable figure.

However, here again is a pitfall for misconception of effects because all of the thermal requirement for the dissociation reaction does not, or need not, come from the sensible heat which remains after the reversion of CO_2 to CO in the secondary stage of coke carbon combustion because some supplementary heat is obtained from hot blast—a return to the coke combustion zone of part of the sensible heat which is rendered latent when the CO_2 from the primary combustion reaction reverts to CO.

A Practical Control — Although the Btu consumption for H_2O dissociation is correct mathematically and with regard to the teachings of technical science research the practical science of furnac-

through communication . . .

More than 4,000 years ago, this receipt* for 5590 large bundles of reeds was inscribed on clay in cuneiform writing. Found in Iraq among the famous Kish ruins, the inscription was dated in 2226 B.C.

*Courtesy of Chicago Natural History Museum

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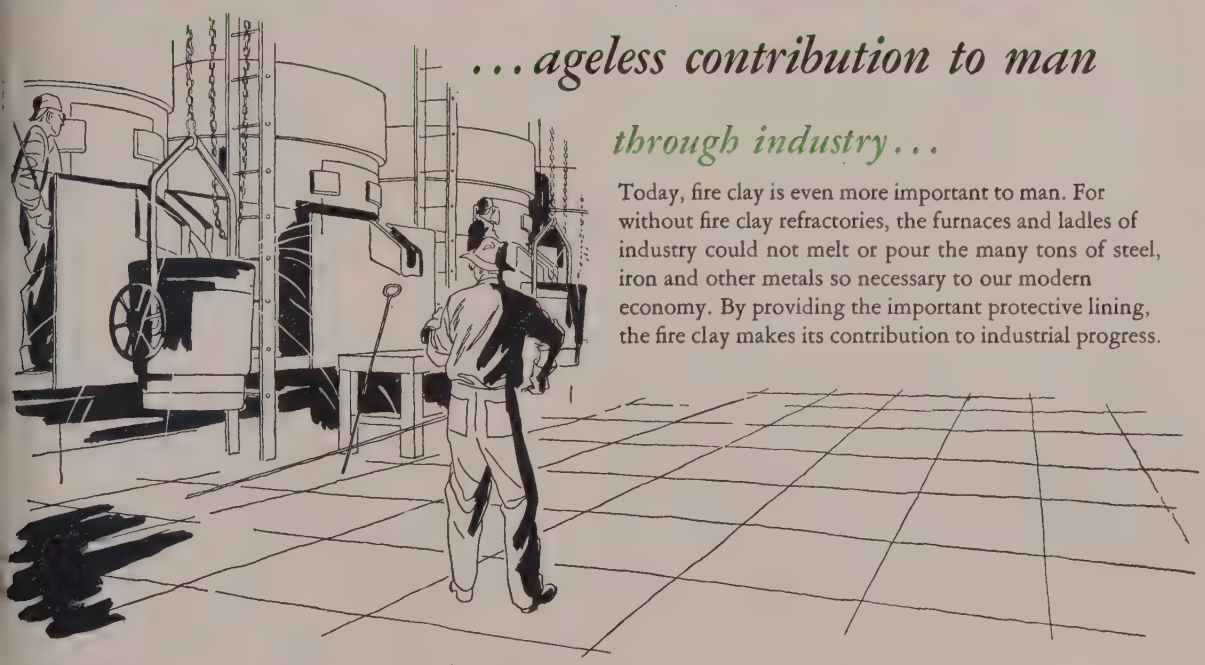

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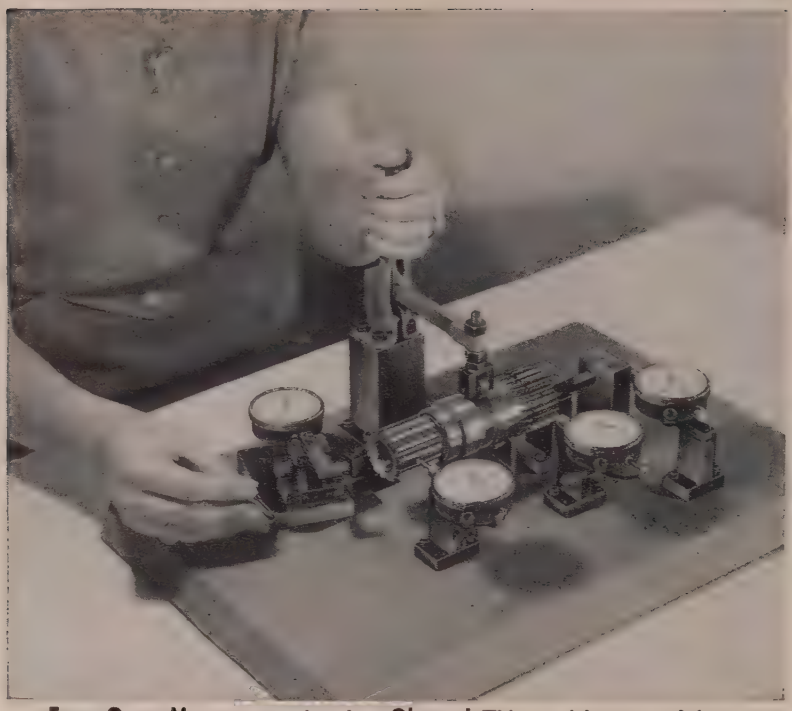

Four Gear Measurements at a Glance! This special set-up of four standard Federal Dial Indicator Gages measures concentricity of pitch diameters of two sets of teeth . . . checks concentricity of end holes against body's O.D. This simple gage is entirely adequate for the problem involved.

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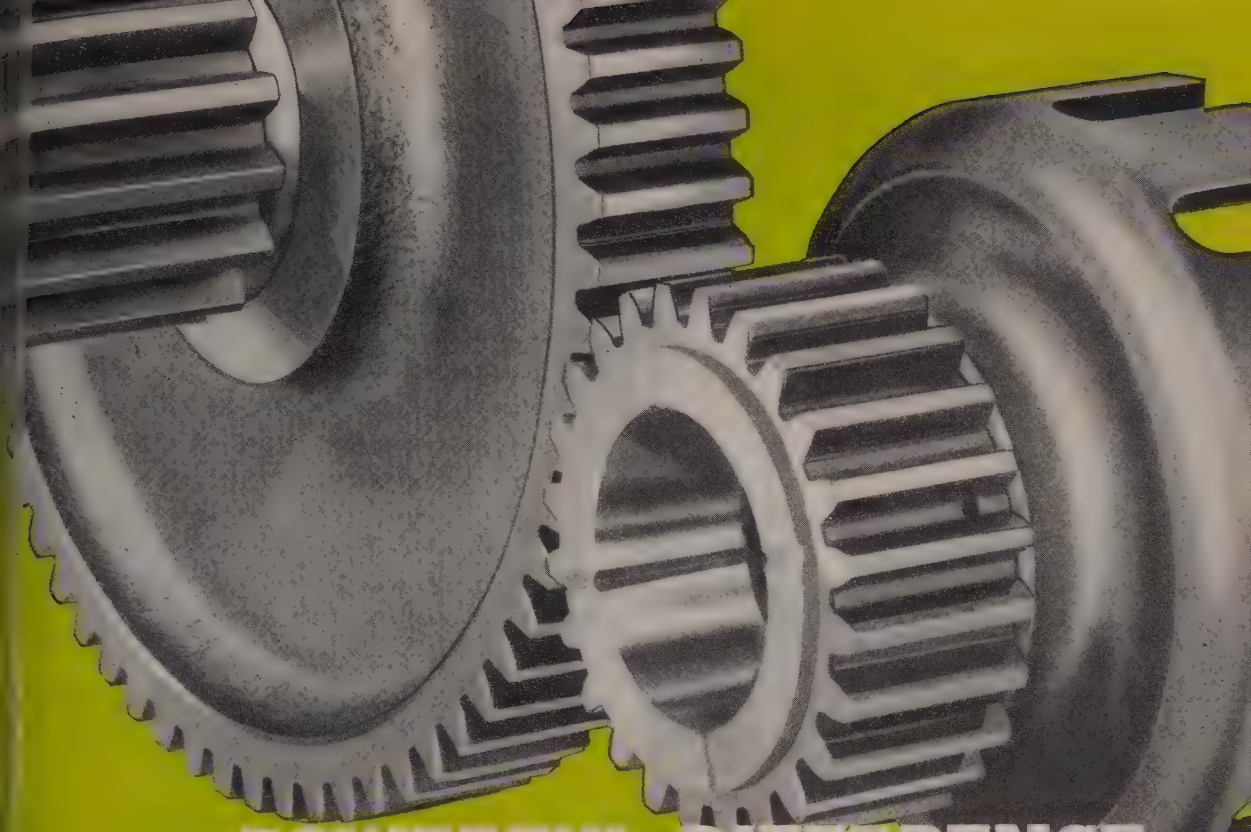
operation has long proved that variable thermal requirements of smelting operation caused by the inevitable fluctuation in blast air water vapor content can be satisfied with equitable adjustment in blast temperature. The fact that modern furnace plants usually have an excess of blast heating capacity is one explanation of the failure of most of the modern dry air plant installations to show any substantial benefit from their use

The writer kept a record of relationship between water vapor content and temperature of blast air during two summer months at a furnace plant where production of merchant iron required frequent burden changes. The water vapor content was recorded by the blowing room engineers, and the blast temperature was regulated by the furnace foremen—without either group knowing the records were being correlated.

Enlightening Results—The manner in which blast temperature was increased and decreased in direct relation to like changes of water vapor content was most enlightening. At furnace plants where sufficient blast temperature has been available to satisfy vari



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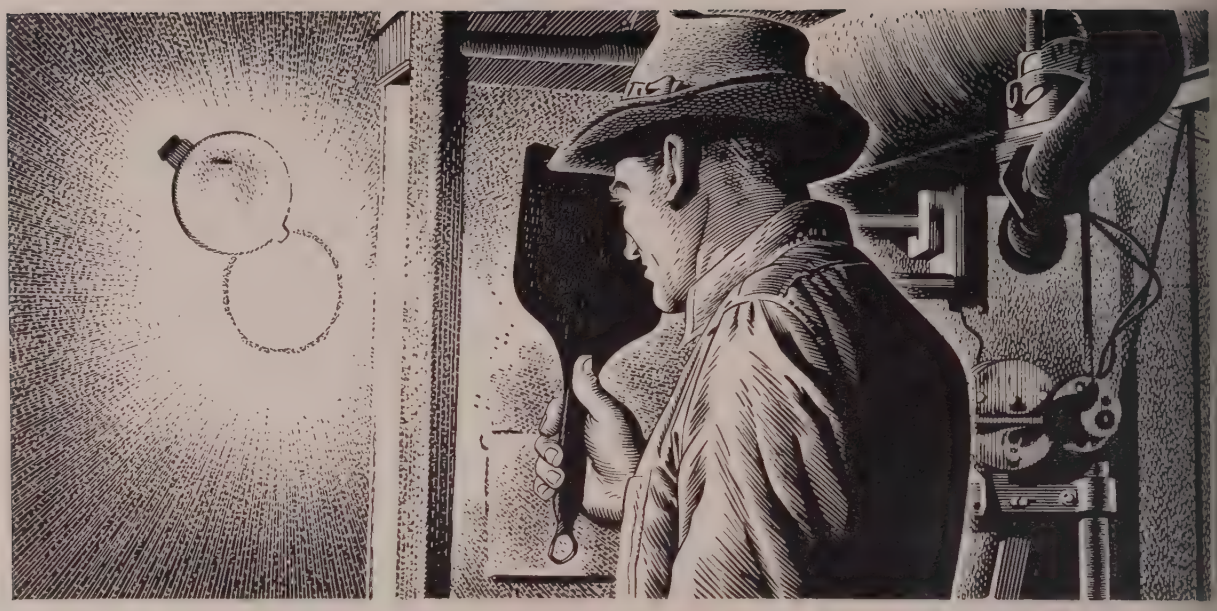

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CONTROL OF EXCESS AIR BY CITIES SERVICE HEAT PROVER CAN REDUCE HEAT LOSSES AT CEMENT PLANTS! In cement kilns, air must be controlled to the precise quantity that will just completely burn the fuel. Any excess of air above this amount carries waste heat out of the kiln. THE HEAT PROVER ENABLES THE OPERATOR TO SEE WHEN THE RIGHT AMOUNT OF AIR IS ENTERING THE KILN.

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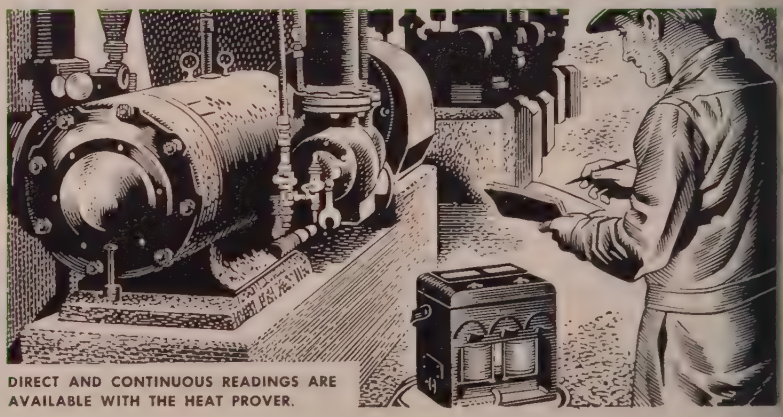

DIRECT AND CONTINUOUS READINGS ARE AVAILABLE WITH THE HEAT PROVER.

heat requirements, no ill effects from the change in water content will be noticeable, if sufficient blast temperature is available the ill-effects will be inevitable and easily detected.

Also, the record was a clear illustration of the basic principle of all blast furnace operation, namely, the relationship between the two divisions of work. No furnace can smelt burden materials faster than it can prepare the materials for smelting. Therefore, the relationship between thermal requirements of the respective divisions of work will always be the factor limiting the degree of blast temperature which can be used successfully.

In Short—Heat delivered to the furnace with blast air must be consumed in the smelting operation in order to prevent disturbance of equilibrium in thermal relationship between the divisions. For the furnace operations being described, burden preparation capacity was deficient in relation to smelting capacity, and therefore, the blast heating capacity which was available could not be used continuously.

Fluctuation in water vapor content of blast air caused fluctuating requirements in the smelting operation, and the existing blast heating capacity was adequate to meet the requirement. If reserve blast heat had not been available, reduction in ore/coke burden ratio would have been mandatory in order to hold iron composition to specification.

Consider Wind vs. Time—Another pitfall for misconception of effects from water vapor is in simply stating the grains of H_2O per cubic foot of air without giving proper consideration to the relationship between cubic feet of air blow per minute and the number of minutes required to produce a unit of iron. The importance of the relationship can be illustrated by comparing data from three furnace operations, Table III, which were analyzed in the series of articles[7].

Although grains of H_2O per cubic foot of air at South are substantially lower than for North and East, the minutes required to produce a ton of iron nullify the seeming advantage since the pounds of H_2O per ton of iron are virtually the same as North and substantially more than East.

One Viewpoint — Raw burden materials are prepared for the smelting operation by first evolving all volatile matter from them; raw air is prepared for the heat generation operation by first removing all water vapor from it. Obviously, preparation of air blast for the carbon combustion reaction is as necessary as the preparation of stock solids for smelting, only the nature of preparation differs. Beneficiation of burden materials lessens the amount of preparation work which has to be performed in the furnace. Beneficiation of raw air by removing the water vapor lessens the amount of work which has to be done in the furnace.

The fact that for most furnace operation the thermal requirements for water vapor disposal

[7] "Blast Furnace Practice," by Charles E. Agnew—a series of 19 articles presented in STEEL, 1951-52 and reprinted in a 62-page booklet.

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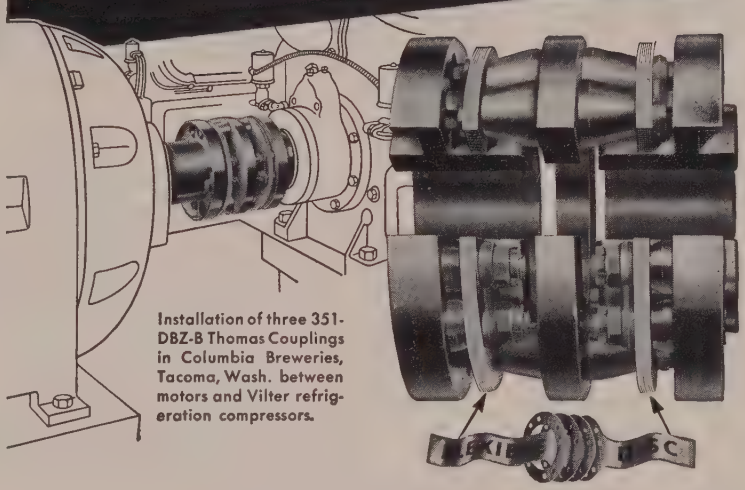

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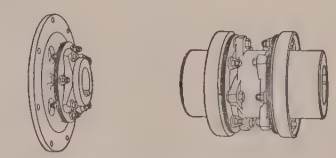

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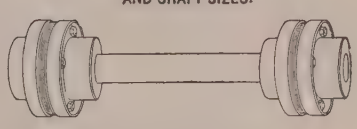

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To 500 VIP's in

Lawrence Remiker

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For them, Lindberg now offers a complete planning, designing and installation service through its new Field-erected Equipment Division.

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Headed by Lawrence Remiker and including R. A. Hastings, Elmer B. Jones and C. F. Masure, a management staff of long experience has been assembled. With enlarged plant capacity, this division is organized to

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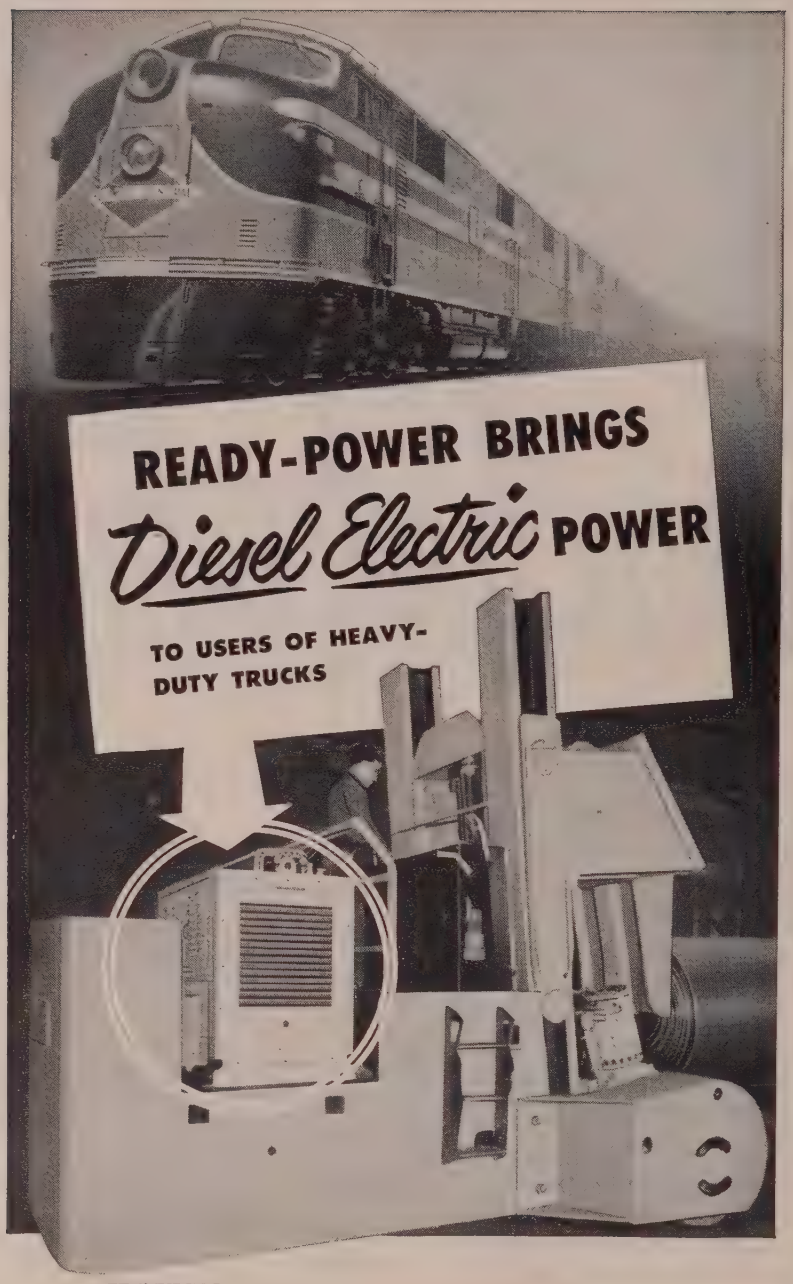

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New use for aluminum foil: Hamilto Watch Co. uses the housewives' Rey nolds Wrap to protect trays of main springs before heat treating. It's precautionary measure that keeps th springs clean and protects finis

can be met without ill effect upo the over-all thermal economy o conversion, and the fact that mos of the dry air plant installation have not been successful, may b cited as circumstances whic prove the basic correctness of th 2-stage principle.

Specifically—So long as the bu den material preparation opera tion is deficient in capacity in re lation to the smelting operatio capacity, any additional heat mad available to the smelting opera tion by removal of water vapo from the blast air cannot be uti ized any more than additiona heat which is made available wit high blast temperature. Howeve if the smelting operation capacit is deficient in relation to the bu den preparation capacity, then ad ditional heat from either or bot of the sources cited can be use

Affects of Beneficiation — Ben ficiation of burden materials t the extent illustrated in East pra tice data not only reduces th burden preparation work to th extent of increasing preparatio capacity enough to reverse th normal relationship to smeltin capacity, but it also permits r duction in the blowing rate with

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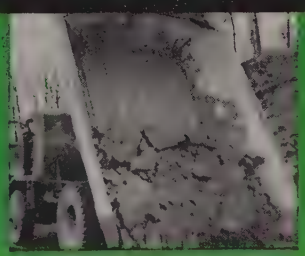
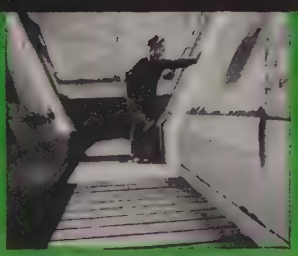
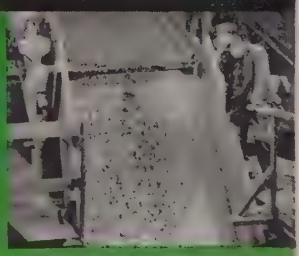
Jalloy lowers maintenance costs on coal conveyors



Jalloy provides longer wear with less repair in truck bodies



Jalloy Plates outlast other steels by margins of 4 to 1



Jalloy Aprons in Tyrock screen last 3 times as long as other steels

J&L Jalloy Heat-Treated Plate is the special purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded. Jalloy is available in three grades to meet various service requirements.

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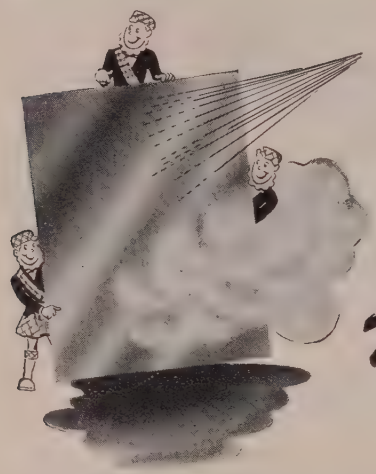

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MicroRold Type 316 Stainless is available as follows:

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Max. 36" wide	No. 4 and No. 7 Finish	.012 to .109
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Condition	Annealed
Ultimate Tensile Strength P.S.I.	85,000
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Elongation in 2 inches, %	55
Rockwell Hardness	B 75-80
Scaling Temperature, °F.	1700
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.005 to .078, in No. 1 and No. 2 Finish
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out injury to furnace productive capacity, and thereby the amount of water vapor charged to the furnace per unit of iron is automatically reduced.

Therefore, all blast heating capacity which otherwise would have to be utilized to counteract the ill-effect of water vapor is made available for supplying additional heat to the smelting operation which has been rendered deficient in relation to the burden preparation operation.

Since by weight water vapor (H_2O) contains 88.89 per cent oxygen, and dry air contains by weight only 23.15 per cent oxygen, 1 molecule of H_2O will burn 3.84 times as much coke carbon as a molecule of dry natural air.

Stock Travel—Since stock travel through furnace is governed by the coke carbon combustion rate, the travel rate can be increased with the use of water vapor (H_2O) oxygen to effect the combustion, to the extent of its ability to supply supplementary heat to the furnace hearth to counteract the ill effects from H_2O dissociation. However, since thermal efficiency of coke carbon combustion in front of blast furnace tuyeres with dry air oxygen is only 29.97 per cent (4370 ÷ 14,580 Btu), and water vapor oxygen only 10.03 per cent (1464 ÷ 14,580 Btu), the ill effect upon conversion economy from decreased thermal efficiency as reflected in available heat from coke combustion will always be greater than any possible benefit from increased stock travel effected with H_2O oxygen.

When all of the various and variable effects from water vapor contained in blast air are taken into consideration, the great amount of controversy which it has caused is not surprising.

(To be continued)

COMING IN STEEL

Next week, Dr. A. L. Feild, Armco's associate director of research, will begin a two-part story, "How To Work Stainless The Easy Way," describing the latest techniques in handling precipitation-hardening alloys.

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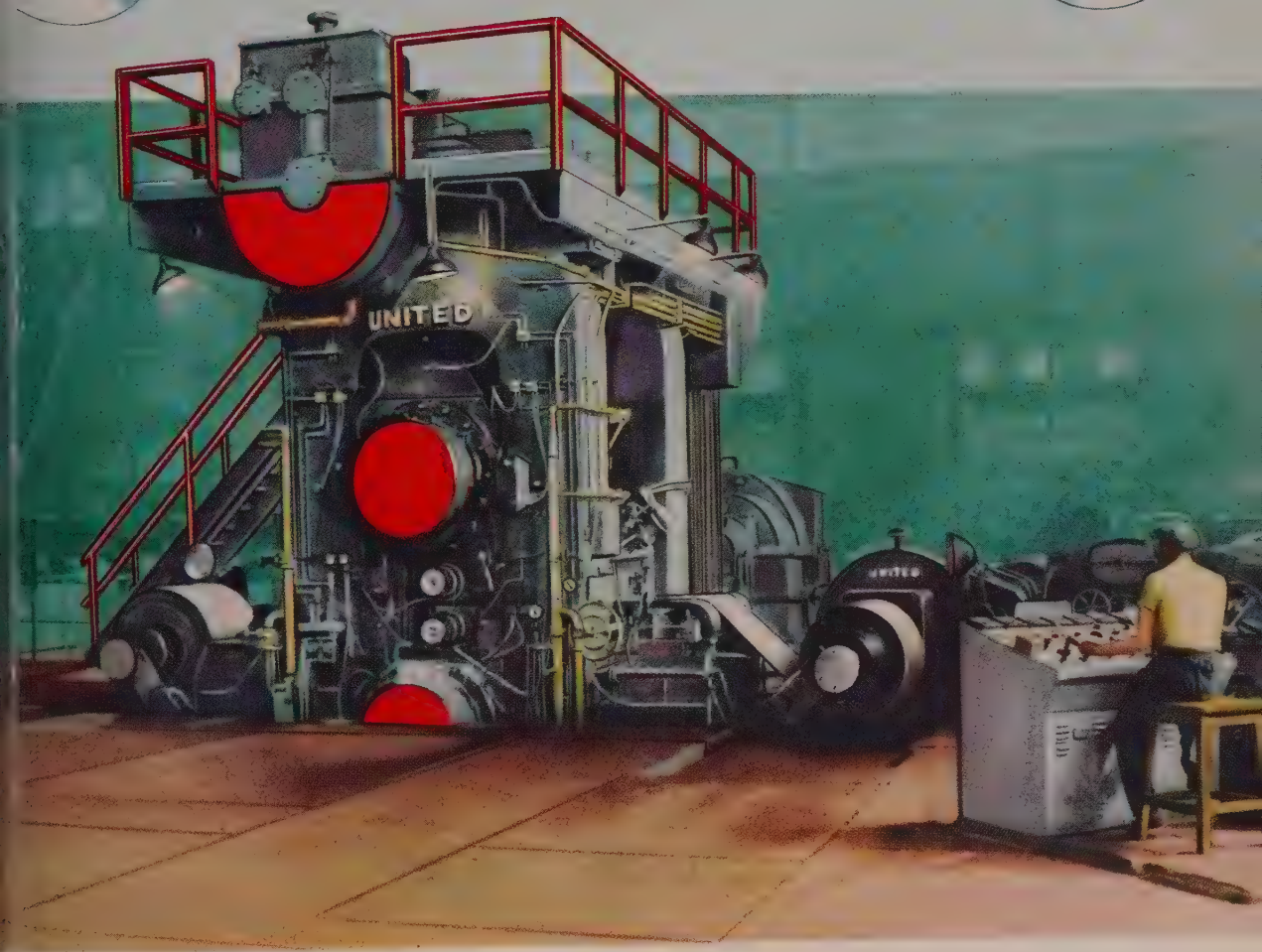

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Your product can gain many advantages from the Needle Bearing's design and performance. Housings, mountings and other related parts can be made lighter and smaller. Lubrication is needed less frequently since the turned-in lips of the bearing keep lubricants in, dirt out. And you get high capacity anti-friction performance for little more than the price of a plain bearing.

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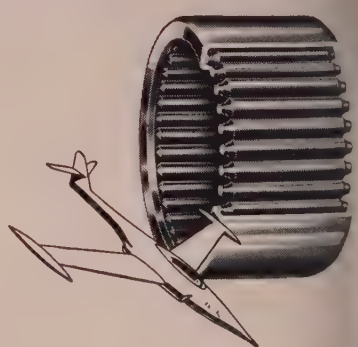

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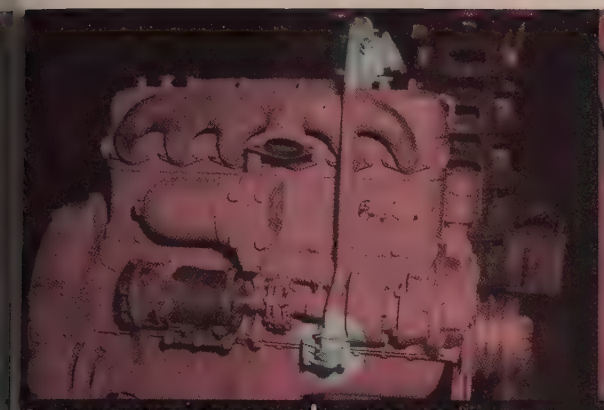

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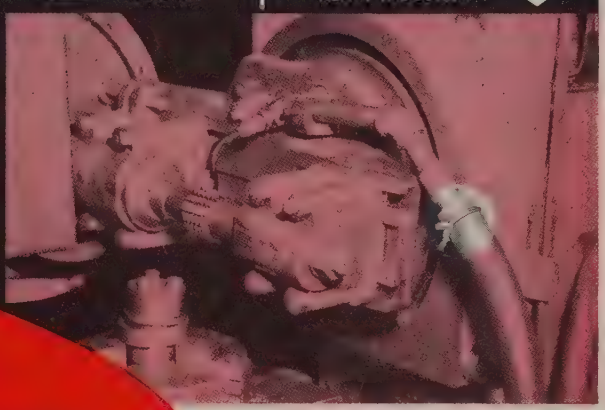

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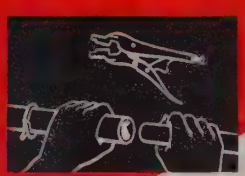

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View of three bays shows overhead equipment used for all handling. Monorails operate in east and west (side) bays, jib cranes between bays, bridge cranes in center

HEAVY PARTS PRODUCTION

Overhead Equipment Handles Everything

Sharp layout, good integration keep bulky, awkward parts moving smoothly at Colonial Iron Works. The company even saves steps by lofting some machines to the work

MATERIAL HANDLING skillfully integrated with plant layout is responsible for a high degree of efficiency in production and for maximum use of available space at Colonial Iron Works Co., Cleveland.

This combination is even more notable because typical loads handled consist of large and awkward shapes of steel in widths up to 150 inches, lengths up to 60 feet and weights up to 24,000 pounds. Such material is used by Colonial in the manufacture of exchangers, evaporators, reactors, distillation outfits and other chemical and process equipment for industry.

Physical Layout—The plant is located on a tract 171 feet wide, 708 feet long, with a private railroad siding as well as truck access at the north end. At this end are located the combination receiving-shipping area and extensive yard storage locations for stock material.

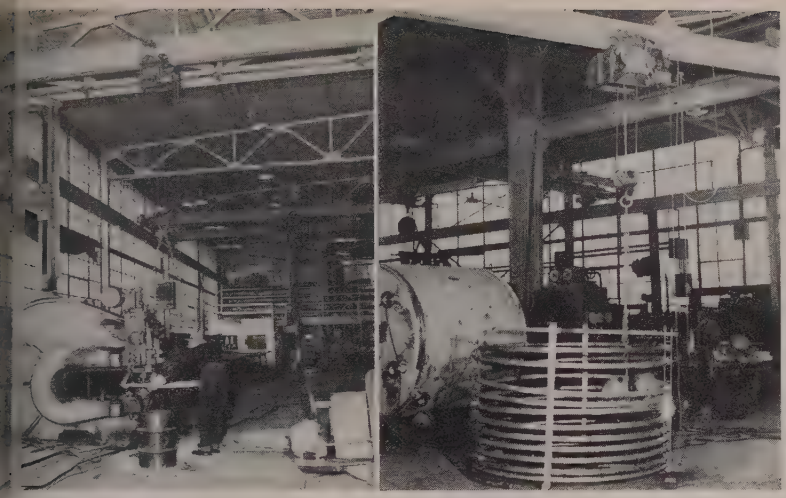
Main plant, which abuts the yard, consists of three bays, each 400 feet long. Both east and west bays are 31 feet wide. The former houses structural fabrication, the latter plate fabrication. Center bay, 54 feet wide, is designed for assembly, testing, inspection, and other final-stage processes. While shipping and receiving normally are assigned to yard facilities, some finished products are shipped by truck through a door at the south end of the center bay.

This layout permits incoming materials to enter the plant and transfer into either of the side bays, according to production scheduling. After first-stage operations are complete, materials are transferred to the center bay for final operations.

Yard Handling — All loading unloading and general yard handling is assigned to a 15-ton-capacity traveling bridge crane, 6 feet wide, which operates on 150 foot runway. The crane can handle load transfer to and from several rail cars without shifting can also operate equally well at the truck zone.

Standard practice at Colonial calls for immediate identification tagging of incoming materials and for their storage in specified locations noted on job requisition sheets. All material is tagged even if it is moved directly to fabrication. In this way, no time is lost in locating and identifying materials when their number comes up during manufacture.

Loads to be moved from the yard to the plant are spotted by the crane on one of two all-steel transfer cars. These four-wheel



erhead equipment is also invaluable for positioning work in process. left, steel sheet is positioned by monorail in press; at right, a jib ne holds rings in place during welding, freeing operator's hands for work

ige crane in yard moves load to outgoing rail cars. carrier handles all shipments except the few loads t are delivered by trucks that enter the plant itself

riers are of sufficient size and acity to meet all requirements l operate on standard-gage rail- d tracks, moving easily through rs inside the plant. For ex- mely heavy loads, a bridge ne operating in the center bay ls the cars inside.

Overhead Network—As with the d, the plant itself is served by extensive network of overhead dling equipment. Two bridge nes, each with 10-ton capacity, rate in the center bay. Both ve a 51-foot span, with 24 feet clearance beneath the crane k, and operate on a 400-foot ck. One crane has a 5-ton aux- ry hoist.

Nine floor-operated bridge nes serve the side bays—four the east and five in the west y. All cranes are 31 feet wide, ve 16 feet of clearance below the hook and operate on runways 400 feet long. They have 2 and 3-ton capacity.

In addition to overhead equipment, the company has also installed 24 two-ton jib cranes, spotted at designated points throughout the area. Many jobs are positioned next to machines to spot loads for such operations as shearing, punching, planing and burning. Additional jib cranes are located at columns between the side bays and the center bay. These serve rolls and brakes in their areas and are also used to transfer loads between bays to points where they may be handled by the traveling cranes.

Rolls and brakes are located so material is fed to the machines from the side bays, emerging when fabricated into the center bay. Thus, a forming operation also doubles as a transfer operation, thereby reducing handling effort and cost.

Material Flow—Incoming loads picked off by the yard crane are stored or, more often, placed directly on a transfer car for movement inside the plant. Here, structurals are diverted to the east bay, plates to the west bay. After initial layout, material is fed through various machining operations located in direct sequence from north to south in both bays.

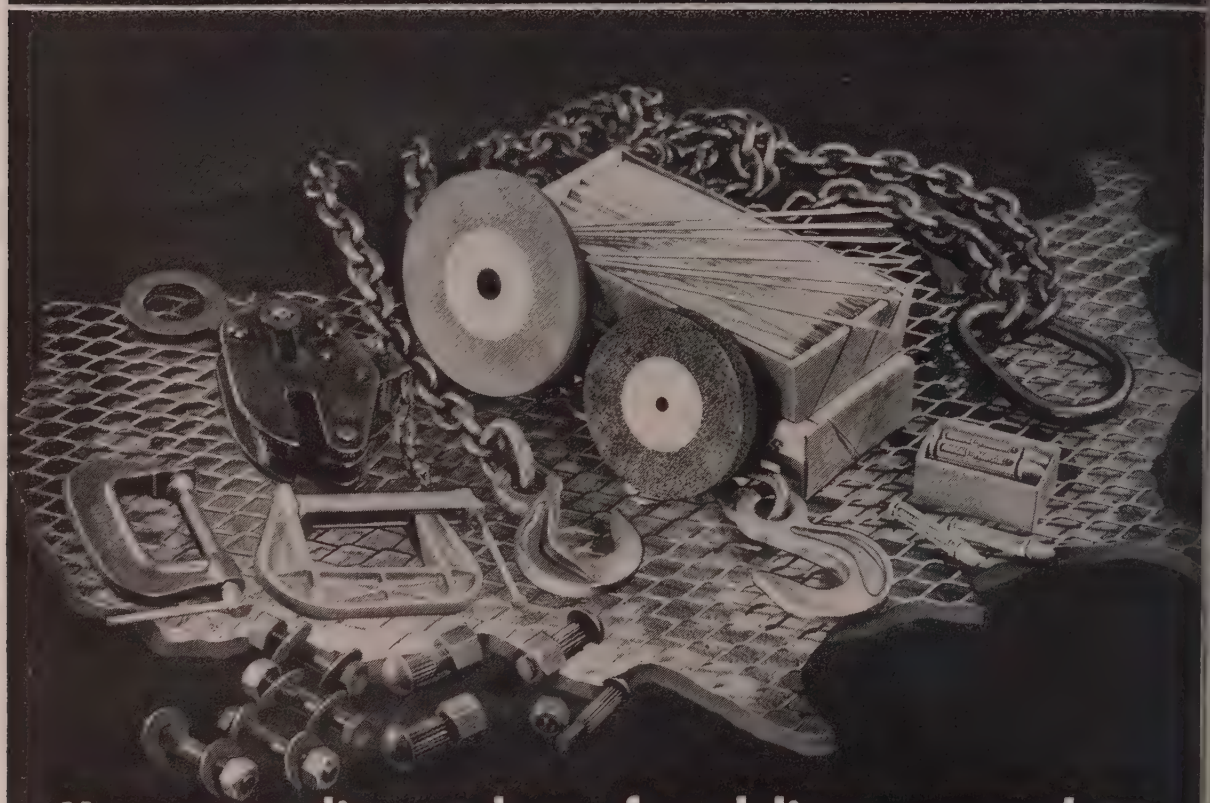
One important feature of the company's material flow is use of certain machine tools as portable equipment. Such tools as throatless shears, saws, small furnaces, etc., are moved to the work by overhead handling equipment. Large, bulky nature of the work compared with the smaller size and ease of handling of the machine tools dictates this unusual practice and has served to avoid a tremendous amount of rehandling, unnecessary backtracking and physical effort. When machining is complete, in-process work is sent through rolls or brakes or directly to fitters in the center bay. Here, final assembly, testing, inspection, etc., is performed, and the product returned through the north doors to shipping.

Results — Epecially noteworthy in Colonial's material handling system is the nearly total elimination of manual effort, and 100 per cent coverage of floor area with overhead equipment. Materials and finished products proceed from station to station without backtracking.

Transfer cars neatly solved the problem caused when center bay and yard bridge cranes could not easily be joined because of their difference in widths. Since transfer between the yard and the plant is on an intermittent basis, the costly process of changing the entire crane installation has been avoided by the rugged, flanged wheel carriers.

Finally, the handling system is credited with a virtually perfect record in the prevention of damage to materials and products, and, even more important, injury to operators as well.

WHY IT PAYS TO BUY SPECIALTIES FROM US



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UNITED STATES STEEL

NEW PRODUCTS and equipment

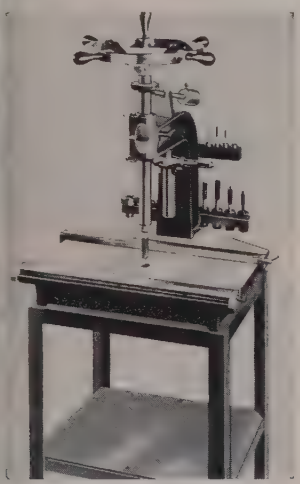
Reply card on page 179 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

ndle Balancing Device

. . offsets assembly weight

his spindle balancing device is d to offset the weight of the ndle assembly and the opera- 's hand. Combined weight ds to force the tap.

he balancing attachment is dily adjusted to compensate



r various size taps and differen- al. Balance weight is set so a ght downward pressure starts e tap cutting, allowing tap, nen retracted, to float free leav- g top thread undamaged. All oving parts are hardened. Lassy ool Co.

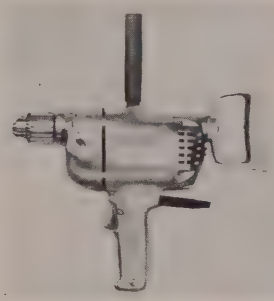
R MORE DATA CIRCLE NO. 1 ON REPLY CARD

ectric Drill

. . . compact, light weight

A heavy-duty ½-inch electric rill has a powerful 6-amp motor nat develops 45 per cent more nuck twist power. Model 516 is ompact and light for its heavy ower. It weighs only 10 pounds nd is 14¼ inches long.

Rear spade-type handle is adjustable for vertical or horizontal position or may be removed. Auxiliary two-position handle permits the operator to apply more pressure and maintain accuracy. A trigger switch provides finger-tip



control with a push-button lock for one-hand operation. The drill has a ½-inch gear type chuck. Bit capacity is rated ½ inch for steel. Porter-Cable Machine Co.

FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Epoxy Resins

. . . combine with many fillers

A new and versatile group of epoxy resins and their hardeners is announced. The two new epoxies, Bakelite C-8 resins BR-18774 and BR-18795, combine with four new hardeners specially synthesized for them to form strong, lightweight products with excellent chemical resistance and electrical properties.

Excellent wetting ability makes possible their combination with many types of inert fillers. They are characterized by rapid hardening, thermosetting resins with 100 per cent reactive components when formulated with their complementary hardeners. Bakelite Co., division of Union Carbide & Carbon Corp.

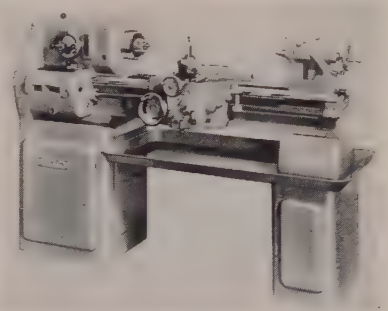
FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Head Lathe

. . . for power, accuracy

The Sebastian 13-inch geared head lathe is an all-purpose precision lathe rigidly built, combining rugged power with accuracy. Outstanding features include the large, heavy bed, zero-precision tapered roller bearings supporting the spindle and large 1⅜-inch hole through the spindle.

Functionally designed to promote the utmost ease in operation,



it incorporates the latest in an automatic oiling system, cam action tailstock clamp and easy shifting spindle speed dial. Sheldon Machine Co. Inc.

FOR MORE DATA CIRCLE NO. 4 ON REPLY CARD

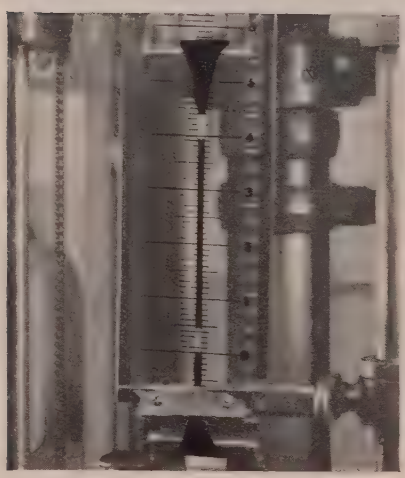
Sheet Stock Tester

. . . standard on machine

Fatigue properties of sheet stock as thin as 0.010 inch can now be determined on the Sonntag SF-2-U fatigue testing machine. A new accessory fixture is furnished with the machine. Former minimum thickness of specimens was 2½ times this figure.

Fixture guides the free end of the specimen in vertical oscillations and forces it into an S-curve or reversing S-curves at 1800 load cycles per minute. Free hori-

No wonder



2. Elongation, tensile strength and maximum compression set ratings are determined with care. Laboratory and service tests make sure these rated characteristics are held.

3. Fluid and temperature tests check compound resistance to oils, fuels and chemicals at high and low temperatures . . . assuring the long life of Parker O-rings.

4. Precision molding of super compounds provides close tolera fits. Parker has molds for *every* stand O-ring size. Mail coupon for data.

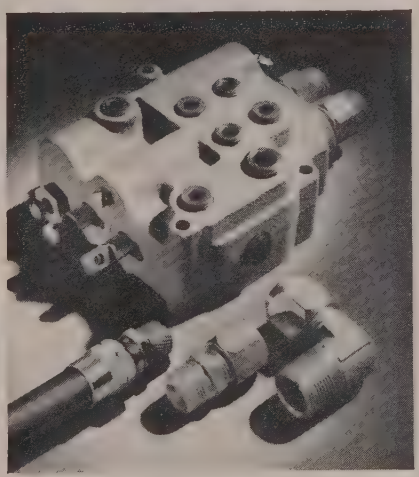
he other one leaked!

Comparison tests prove Parker-formulated rubber O-rings successfully withstand fluid, temperature, pressure conditions

1. New non-flammable hydraulic fluids ruined one O-ring . . . didn't harm the other in this sealing test. Both were originally the same size. Yet, one is now swollen, chewed and chipped. The other wasn't damaged because it was molded of a Parker compound that resists nonflammable fluids.

Pressure and temperature can also cause problems. When you use Parker O-rings, you are sure to get exactly the *right* O-ring for your *specific* application. We invite you to compare Parker O-rings with any other make. Here are some of the reasons why you'll find they seal better and last longer . . .

Compare actual samples. Ask Parker representative to check specifications. Prove how Parker ngs seal better and last longer.



6. What other Parker products interest you? *Triple-lok* flare tube fittings, *Ferulok* flareless tube fittings? *Hoze-lok* fittings and hose assemblies? Directional control valves?

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THE PARKER
APPLIANCE COMPANY
Section 507-N
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Cleveland 12, Ohio

Please send me the following information:

☐ O-ring catalog No. 5100

☐ Custom-molded rubber catalog No. 5201A1

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COMPANY_____

ADDRESS_____

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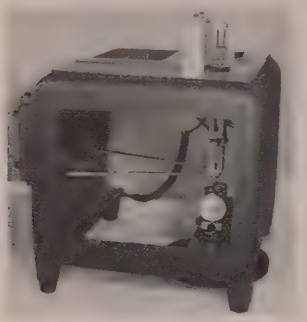
RUBBER PRODUCTS DIVISION
The Parker Appliance Company
17325 Euclid Ave., Cleveland 12, Ohio
1538 South Eastern Ave., Los Angeles, Cal.

Parker

Hydraulic and fluid
system components

zontal movement of the fixture head, produced by the strain of



the specimen, is provided through two flex-plates. Baldwin-Lima-Hamilton Corp.

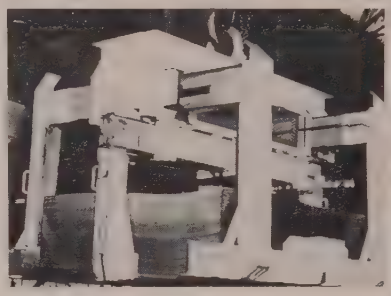
FOR MORE DATA CIRCLE NO. 5 ON REPLY CARD

Sheet Grab

. . . for one-man operation

Mansaver sheet grab, with motor-driven end hooks adjustable from a common point supported from the cab proper, enables the crane operator to pick up and release large or wide sheets without the need of a floor operator.

This design is intended to increase speed of operation and decrease the chance of sheets sliding endwise, improving the safety of the operator. Mansaver Industries.



FOR MORE DATA CIRCLE NO. 6 ON REPLY CARD

Wheel Forming Attachment

. . . simplifies tool grinding

A new Diaform wheel forming attachment is designed to simplify grinding of relief angles on forming tools. Available in three models, it works on the pantograph principle.

Series R Diaform eliminates the need of distorted templates, projection drawings and lengthy calculations in order to retain true form of the cutting edge on a forming tool when grinding required relief. Pratt & Whitney, division of Niles-Bement-Pond Co

FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

Punch and Shear

. . . widths to 48 inches

With a 5-ton capacity and 24-inch throat, the No. 5-24 deep throat lever punch and shear permits accurate, smooth shearing in straight lines or intricate shapes. It shears from front to back or left to right and slits sheets of infinite length up to 48 inches wide, down the center.

It is equipped (optionally) as punch or shear, or both, and is readily converted from one to the other. Niagara Machine & Tool Works.

FOR MORE DATA CIRCLE NO. 8 ON REPLY CARD

Nickel Application

. . . to raw, anodized aluminum

A new process for applying nickel directly to either raw or anodized aluminum is said to afford an erosion-resistant surface and materially strengthen the aluminum.

With the new Alni-Clad process a stress-free, ductile and pore-free surface can be applied in any required thickness. Material pro-

GOES OVER BIG for wheeling and dumping heavy materials

Specify Sterling No. 119
HEAVY-DUTY CART
Pneumatic-tired wheels or steel wheels

FIFTY years ago Sterling men had faith that wheelbarrows would "go over big" if made so rugged they would cost users *less per year.* Response from men of industry proved this Sterling idea to be right! Through the years, Sterling progress has provided wheelbarrows made the way *you* needed them . . . easy-wheeling, longer-lasting, to cost you less per year, designed for the specific work *you* do with wheelbarrows and carts. See the whole Sterling line.

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Look for this Mark of STERLING Quality

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"EZ" is a well-known symbol to users of Allegheny Ludlum products. We've been producing easy-machining stainless steel grades under that symbol for many years . . . they're a standard in the industry for improved machining characteristics.

This long experience, applied to the "EZ"-machining grades of the three High Speed and two Die Steels listed above, is your assurance of dependably uniform free-cutting qualities and improved finish—wherever such properties are desirable in your operations.

All five grades have been thoroughly proved and are readily available in the usual wide range of shapes and sizes. ● Write for literature on the grade(s) in which you are interested. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.*

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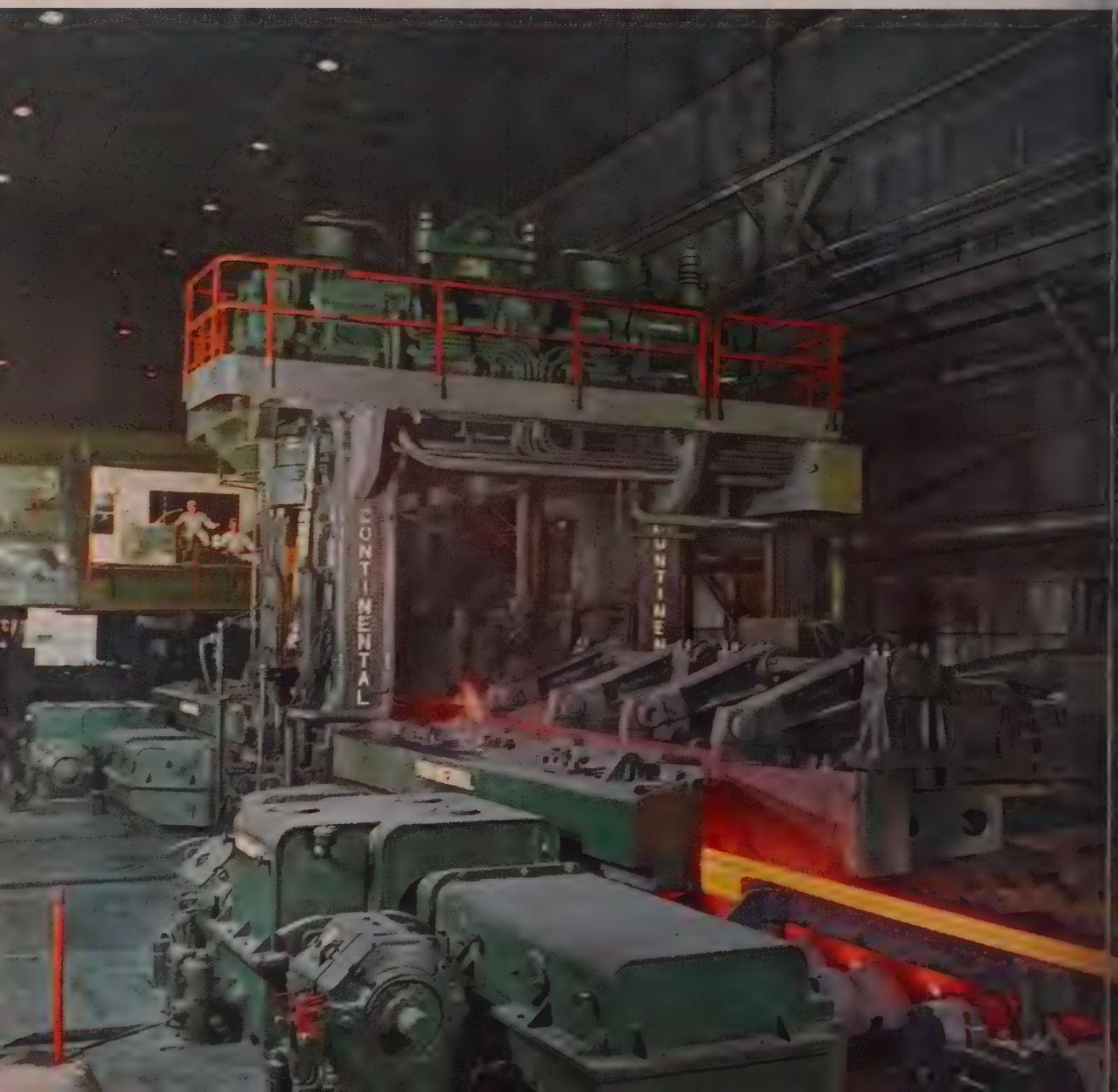
CONTINENTAL

40-INCH BLOOMING-SLABBING MILL

WITH AUXILIARY EQUIPMENT IN FAIRLESS WORKS

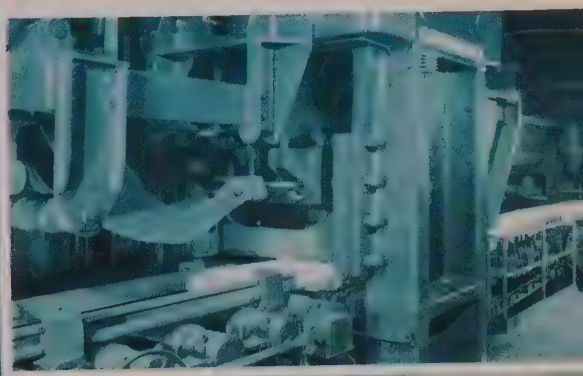
Continental designed and built this complete 40-inch Blooming-Slabbing Mill for United States Steel Corporation's new Fairless Works. Installed for intermediate blooming, it also has been employed in rolling slabs direct from ingots.



View of mill from Operator's Pulpit.

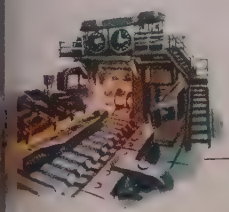
Continental Downcut Bloom and Slab Shear.

Continental High Speed Transfer delivering blooms to the mill.



★ Complete Rolling Mill Installations ★

ROLLS STEEL CASTINGS WELDMENTS



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CONTINENTAL
Foundry & Machine Company

Here's a One-Man Bulk Materials Handling System for Your Plant...

In the Dempster-Dumpster System of bulk materials handling only one man, the driver of the truck-mounted Dempster-Dumpster, is required for operation. The Dempster-Dumpster serves scores of detachable Dempster-Dumpster Containers. Container capacities range up to 4 times that of conventional dump truck bodies and each container is designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. You simply place these containers at convenient materials accumulation points inside or outside buildings. When loaded each container is picked up, hauled and emptied (as shown above) or load set down intact. Entire operation is handled by hydraulic controls in cab.

Containers shown below are just a few of the many available or that can be built to meet your needs. They enable you to handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc. —with only one truck and only one man, the driver.

Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck ever devised!

Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

DEMPSTER BROTHERS, 664 Dempster Bldg., Knoxville 17, Tennessee

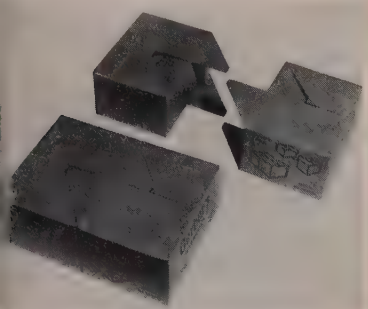
iced can be sheared, bent or fabcated. Wide variation in the aracteristics of the nickel can so be secured. Bart Laboraries Co.

R MORE DATA CIRCLE NO. 9 ON REPLY CARD

terlock Box

. . for multiple packing

Interlock box is a multiple pack nsisting of two or more indidual boxes joined together by terlocking arms. It is designed r use with a core sealer to glue e extending arms joining the ctions. Completely sealed units



sult when the sections are cut part for case-breaking.

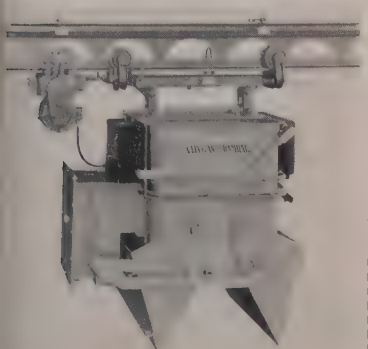
Pack is especially adapted to ipment of cans and packaged ods subject to small-quantity stribution. Hinde & Dauch.

R MORE DATA CIRCLE NO. 10 ON REPLY CARD

ravel, Discharge Bucket

. . . for overhead cranes

A traveling bucket for handling y, granulated or lump materials d moist mixtures was designed



the Cleveland Tramrail Disision for use on Tramrail overead track and crane systems. It

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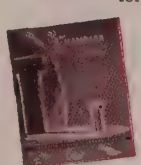
There is a CHANDLER cold wrought metal fastener to meet your specifications. Manufactured from the finest steel stock available, these metal fasteners are rigidly inspected to insure uniformity, accuracy, and precision. CHANDLER fasteners provide maximum resistance to stress, vibration and shear. To meet your industrial requirements, specify cold-forged fasteners by CHANDLER.



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1264-CH

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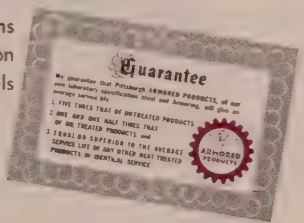
• This combination of hard treads and tough cores gives average service life up to five times that of untreated gears. It is your assurance of lower crane wheel costs. And PITTSBURGH gives you a written guarantee that you'll get this exceptional service.

• Available in sizes from 10" to 30" diameter. Treads: flat, tapered, radius, or "Pittsburgh Gear Company Standard." Bores and hubs may be finished by you or by us to your specifications.

Do This Today: Send us specifications of the wheels you use and we'll quote on PITTSBURGH Armored Crane Track Wheels ...guaranteed to give longer service.



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subsidiary of BRAD FOOTE GEAR WORKS, INC. • CICERO 50, ILLINOIS

is powered by a tractor drive. Travel route includes a lift of 25 feet.

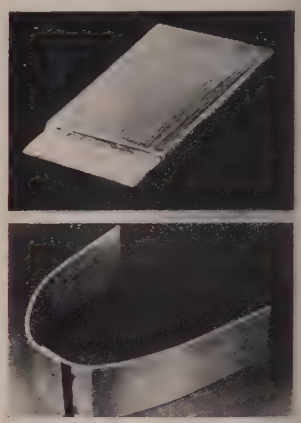
The bucket has a capacity of 22.5 cu ft and is rated at 2000 pounds. It has a split-hinged gate operated by a motor protected by a box enclosure. Wide opening gate facilitates discharge of slow moving, tacky materials. Cleveland Crane & Engineering Co.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

Structural Adhesives

. . . strong, flexible

Two structural adhesives for bonding metal-to-metal and metal-to-plastic offer broad applicability



to civilian industrial production needs.

Bondmaster M615 offers extremely high strengths at normal temperatures. Bondmaster M616 is reported to provide strengths up to 3000 psi at 180°F while maintaining exceptional flexibility. Rubber & Asbestos Corp.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

Magazine Attachment

. . . simplifies second operations

Alco Tool has developed a magazine attachment for B & S automatic screw machines which permits second operations to be performed semi-automatically.

It consists of a complete setup, including the magazine for holding and carrying work to the chuck, cams, form tools, and a chuck complete with ejector and inserting tool. Easily attached, it is mounted on the front cross slide of the ma-

INVOLUTE TEETH and CAM SURFACE

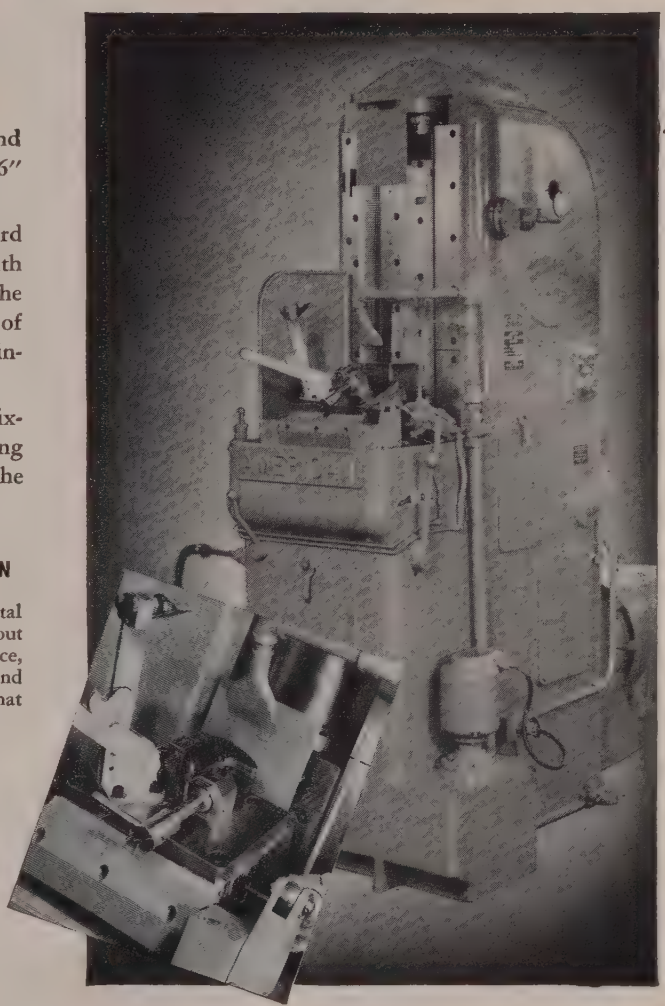
BROACHED IN A SINGLE PASS

500 PIECES PER HOUR

roaching .015 from the top surface of the cam and ear segment and cutting involute gear teeth 1/16" eep would ordinarily be a two-step operation.

American engineered this job on a standard American T-8-24 3-way type machine equipped with fixture unit built to hold four blanks at a time. The nit provided complete finishing from the blank of ll surfaces in a single stroke, maintaining 500 finshed parts per hour production.

The machine cycle is manually controlled. The fixure tilts up automatically at the end of the broaching troke to permit unloading and reloading during the eturn stroke.



FOR ECONOMICAL PRODUCTION... CONSULT AMERICAN

f you're looking for low cost per part on a production metal removal operation, why not ask American engineers about broaching? You will get the advantages of their experience, gained through more than twenty-five years saving time and money on every type of broaching. You can be certain that recommendations by American are sound and basic.

American's 3-way machine packs a versatile punch. Write for illustrated bulletin showing the jobs it can do. Ask for Circular No. 100.

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"Let's call in T.W."
"ONE OF THEIR STANDARD RESISTANCE WELDERS COULD BE THE ANSWER"
● Like any other commodity, when you buy a standard resistance welder instead of a special, you save money and get shorter delivery.
Perhaps you have been thinking in terms of a "special" welder when a standard might do the job. T-W is a logical source because they make more standard spot, seam, flash-butt and projection welders than any other manufacturer, in addition to a wide variety of special welders.
From T-W, you can receive the necessary data on which to base a decision, such as: a comparison of a standard and a special; power requirements (three-phase or single phase); rates of production; welding cost per unit of production; installation recommendations.
Outline your needs to the nearest T-W sales office or the home base in Warren, Ohio. Prompt reply to your inquiry.
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TAYLOR-WINFIELD
RESISTANCE WELDERS
THE TAYLOR-WINFIELD CORPORATION • WARREN, OHIO

chine and is ready for immediate operation. Odd shaped parts and parts which heretofore have been difficult to magazine, are being handled successfully with this attachment. Alco Tool Co.

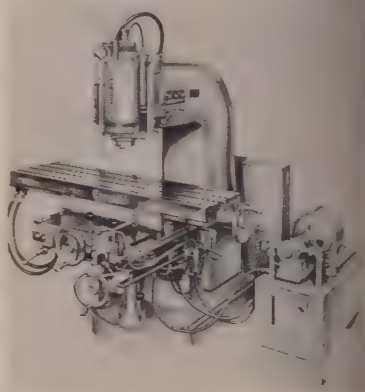
FOR MORE DATA CIRCLE NO. 13 ON REPLY CARD

Nonferrous Miller

. . . milling speed increased

Onsrud A-245 Hydro-Feed milling machine is a medium-size, hydraulically-controlled unit offered especially for nonferrous milling. The manufacturer reports the machine is responsible for a considerable increase in milling speed on all sizes and shapes of parts.

Engineering features include centrally-located, simplified hydraulic feed controls, developed so manual



control can take over at any time without stopping the hydraulic system. Directional, knee, cross and table feed controls have five forward and reverse positions, including rapid traverse. Table speeds: 0 to 150 ipm. Onsrud Machine Works Inc.

FOR MORE DATA CIRCLE NO. 14 ON REPLY CARD

Boiler Cleaning

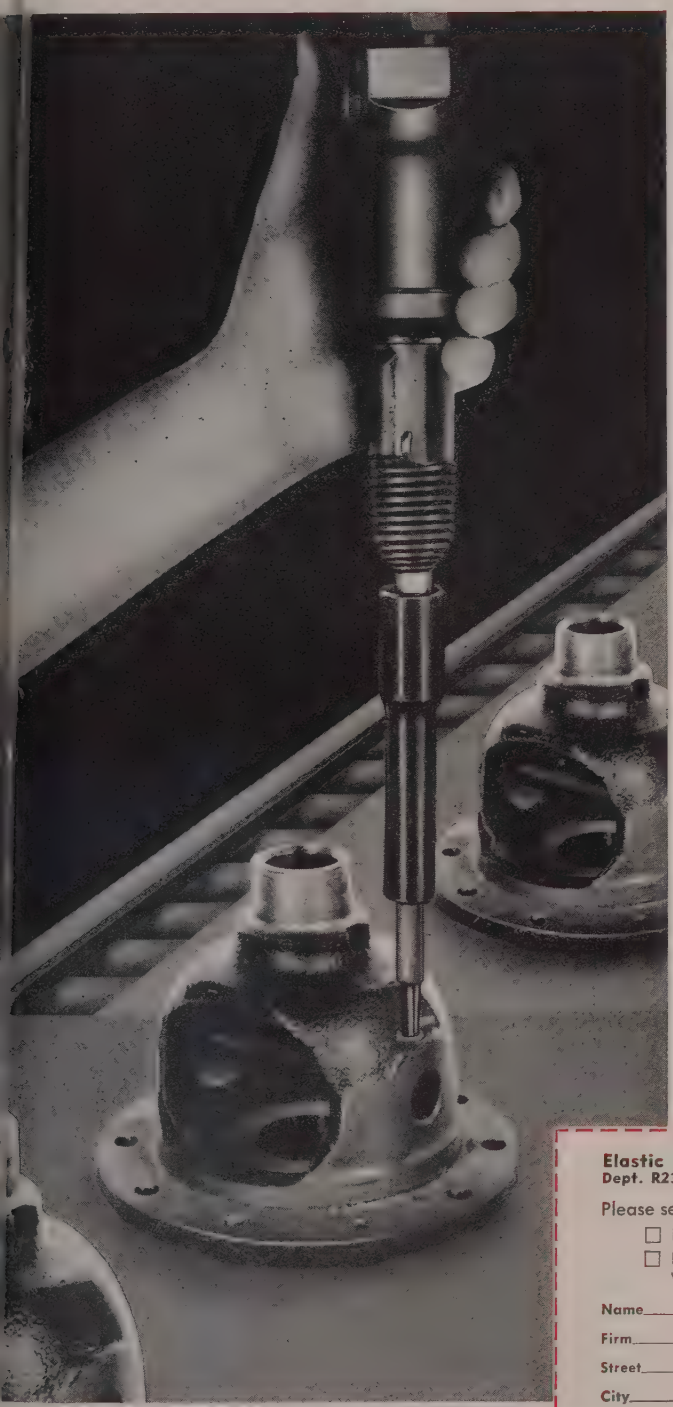
. . . dissolves scale, corrosion

Series 31-H formulas consist of colloidal formulas, which, when added to water of various types, dissolve all forms of scale and corrosion, oil and grease and hold resulting solid particles in suspension. Mud and sludge are carried off. Normal boiler operation is not disturbed.

The formulas blend with boiler water and clean wherever water or steam travels, including the en-

ord Cuts Assembly Costs using

ROLLPIN TRADE MARK



*Rollpins applied as differential pinion pin lockpin on the Ford Motor Mound Road Plant assembly line.

Rollpin is the slotted tubular steel spring pin with chamfered ends. Simply drive it into holes drilled to normal production tolerances. It compresses as driven—and its spring action locks it in place regardless of impact loading, stress reversals or vibration.

Rollpin assembly eliminates extra operations and parts. There is no precision drilling, threading, peening—and no cotter pins or other locking devices. Cost savings as great as 90% result—depending upon the type of fastener replaced and the assembly method now in use. Our illustration is an air gun set-up that installs Rollpin at the rate of 8 units a minute on the Ford assembly line.*

Other insertion procedures range from simply driving Rollpin with a hammer to more intricate hopper-fed methods. Independent time studies have shown installed costs of Rollpin at *9%* of that for a dowel pin and *less than 5%* of the installed cost of a taper pin.

Mail our coupon for information on how Rollpin will do your fastening faster and cheaper.

ELASTIC STOP NUT CORPORATION OF AMERICA

Elastic Stop Nut Corporation of America
Dept. R23-660, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastening information:

☐ Rollpin bulletin ☐ ELASTIC STOP® nut bulletin

☐ Here is a drawing of our product.
What ESNA® fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

tire steam side and system and back through the condenser. No other methods are required with its use. Water Treatment Co. of America.

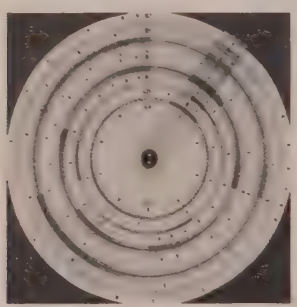
FOR MORE DATA CIRCLE NO. 15 ON REPLY CARD

Circular Slide Rule

. . . 8 inches in diameter

An 8-inch-diameter circular slide rule of durable laminated plastic is equivalent to a straight type slide rule over 20 inches in length. It performs functions of multiplication, division, proportions, finding squares or square roots, cubes or cube roots, reciprocals and logarithms.

Complete instructions are permanently printed on the reverse side.



These simply written instructions are intended to be easily understood by anyone having a slight knowledge of mathematics. Allegheny Plastics Inc.

FOR MORE DATA CIRCLE NO. 16 ON REPLY CARD

Rotary Wheel Blaster

. . . for wet, dry surfaces

A portable rotary wheel blaster which prepares surfaces for finishing is designed for economical blasting in preparation of pipe, wire and flat stock. It is driven by a 5-hp electric motor, weighs 500 pounds and can be transported where needed. Functions are to blast, reclaim and recycle abrasive and filter dust. Use of abrasive is about one pound to 200 sq ft of work, in applying commercial finish.

Advantages include quick finish applied to wet or dry surfaces.

Equipment includes heavy nylon brushes. The abrasive, contained in lower section of the unit, is charged from below. Pitmar Centrifugal Machine Corp.

FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 179 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Cast Iron

International Nickel Co. Inc. — Bulletin D1-1, 12 pages with illustrations, graphs and charts, describes a recently-developed family of irons which possesses the process advantages of cast iron and has engineering properties that approach those of cast steel. Potential applications are indicated.

FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Wire Rope

John A. Roebling's Sons Corp.—"Wire Rope Recommendations and Catalog" was designed to provide a simplified ordering plan and reference for wire rope users. Divided into 16 sections, each is marked by index tabs for quick reference and gives detailed information on wire rope for specific requirements.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

Investment Casting

Hitchiner Mfg. Co.—Bulletin No. 154, 11 pages, gives the steps in investment casting designing for investment castings, cost and why they are qualified to do your casting.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Tube, Rod Straighteners

Torrington Mfg. Co.—A 4-page bulletin covers their high speed tube and rod straighteners. Roll adjustment, roll arbors, drive are briefly described, with speeds listed in chart form.

FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

Heat Treating Alloys

Surface Combustion Corp.—A new bulletin on furnaces for heat treating nonferrous metals and alloys is available. Furnaces for copper and copper alloys, aluminum and magnesium alloys, plus others, are included. Latest developments in equipment for controlled atmosphere processing and use of high speed or high thermal heating for forming are described in the 4 pages.

FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Tracer Control

General Electric Co.—An all-electric tracer control system which provides automatic control of one or more machine motions is described in bulletin GEA-6122. The 6-page publication explains, through use of diagrams, the operation and components of the basic tracer control and its variations.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

Milling Cutters

Motch & Merryweather Machinery Co.—Cutting Tool Mfg. Division offers a 7-page catalog covering Kroslok face milling cutter and shell end mill. Technical data, instructions for ordering are included. Catalog is illustrated, and complete data for all Kroslok blades are listed.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

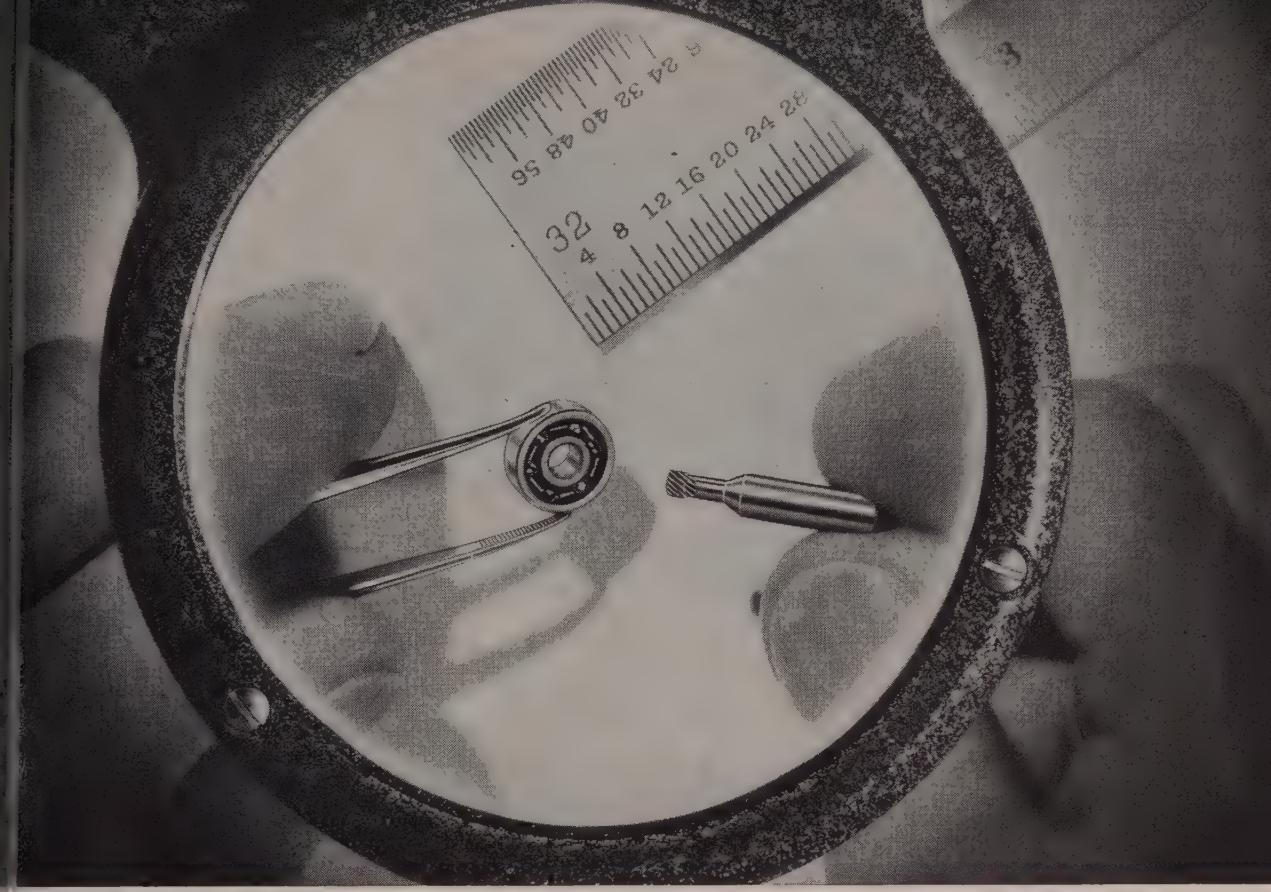
Fused Alumina

Carborundum Co. — A 54-page booklet covers facts about fused alumina. Table of contents includes: Crystalline Alumina in Nature; Development of Fused Alumina; Thermal Properties; Electric Properties; Production. Tables, charts and diagrams are included.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Welding Manual

Eutectic Welding Alloys Corp.—"Manual of Design and Welding Engineering" provides a compact, condensed form of Eutectic's larg-



Finishing Small Holes
(Down to .032" dia.)

ECONOMICALLY . . .
OVER 2,000 PIECES PER BUR

RAPIDLY . . .
AS LITTLE AS 30 SECONDS PER PIECE

ACCURATELY . . .
TO .0002" FOR SIZE AND 50 MILLIONTHS FOR ROUNDNESS

...can't beat a KELLERFLEX CARBIDE HOLE FINISHING BUR

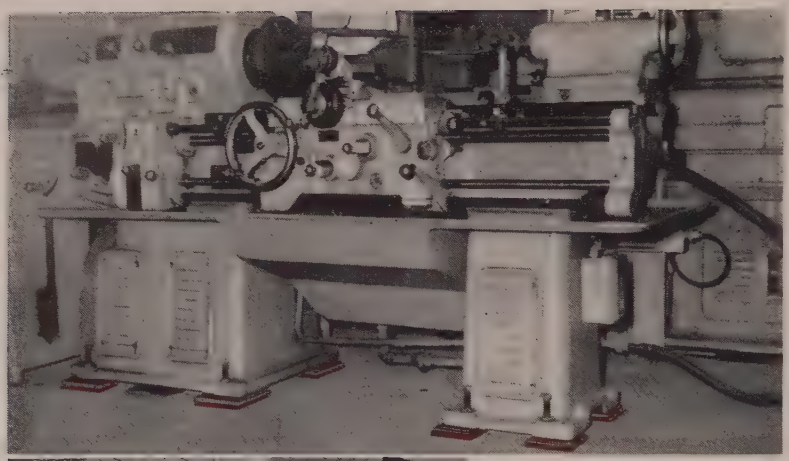
Small hole finishing with Pratt & Whitney KELLERFLEX Burs is superior to all other methods. In actual production, a single bur has finished as many as 3,000 holes in hardened steel bearing races . . . compared to only 7 for mounted points. Only Kellerflex Carbide Hole Finishing Burs, engineered and master machine ground for precision and concentricity, can deliver this cost-cutting performance.

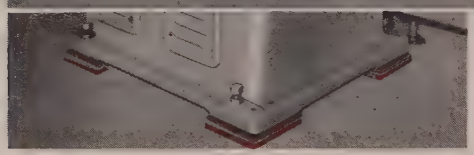
PRATT & WHITNEY
DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U. S. A.
SINCE 1860

First Choice for Accuracy

OFFICES . BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS (The Stanco Co.) • DETROIT • HOUSTON (The Stanco)
OS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST LOUIS • EXPORT DEPT., WEST HARTFORD

SHINE TOOLS • CUTTING TOOLS • GAGES





Precision lathe mounted on new Type "T" UNISORB. Bottom photo shows close-up of machine base and use of UNISORB with leveling screws and steel plates.

New Type "T" UNISORB® Mounting Pads Used for Precision Machines...

For precision machines which must remain extremely level during operation, Type "T" UNISORB is now available. Like other types of UNISORB, this type reduces transmitted vibration and is used without bolting machines to the floor.

Condensed information about new Type "T" UNISORB Mounting Pads

Loading: carries loads of 75 to 125 lbs. per sq. in.

Thickness: ⅜" thick material with a greater density and firmness than other types of UNISORB.

Uses: include mounting of precision lathes, grinders, planers, jig borers, etc.

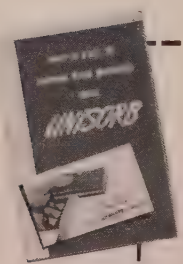
Resistant to petroleum products, mild acids and plant water conditions, Type "T" UNISORB provides a firm and durable mounting.

For the complete story about this new product and other types of UNISORB Mounting Pads, return the coupon today.

The **FELTERS** Co.

231 SOUTH STREET, BOSTON 11, MASS.

"FELT FOR EVERY USE"



RETURN COUPON NOW! Please send information about Type "T" UNISORB and the booklet "Facts About Anchoring Your Machines with UNISORB".

Name..... Title.....
(Please Print)

Company.....

Address.....

City..... Zone..... State.....

Return to: The Felters Co., 231 South St., Boston 11, Mass.

er manual. This 14-page, pocket-size booklet contains detailed instructions on joint design, types of joints possible, their names and when and why they should be used on a given operation covered.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Vibration Analysis

International Research & Development Corp.—A 16-page brochure titled "Balance—Final Dimension of Precision" discusses relationship between vibration phenomena and precision manufacturing, and illustrates the advantages of IRD vibration analysis equipment in seeking out and eliminating unwanted vibration in rotating parts.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CARD

Welding Studs

Gregory Industries Inc.—A wall chart listing part numbers and dimensions of standard, available-from-stock Nelson threaded MG studs and ceramic ferrules is included in a new "Cost Saver Kit" offered by the Nelson Stud Welding Division. Special purpose studs of a number of types are also illustrated and described briefly, as well as the equipment used in this fastening method.

FOR MORE DATA CIRCLE NO. 28 ON REPLY CARD

Handling Problems

Clark Equipment Co.—How five companies in five different industries attacked their handling problems is explained and illustrated in the current 20-page issue of "Material Handling News." Another article, titled "How to Treat A Fork Truck Like a Friend" gives pointers on productive maintenance.

FOR MORE DATA CIRCLE NO. 29 ON REPLY CARD

Reinforcing Steel

Joseph T. Ryerson & Son Inc.—An 8-page bulletin describes what is referred to as a specialized service to the construction industry on high-bonding type concrete reinforcing bars, wire fabric, spirals, expanded metal, caisson rings, reinforcing accessories and other steels for building construction.

FOR MORE DATA CIRCLE NO. 30 ON REPLY CARD

Diesel Engines

Cooper-Bessemer Corp.—An engineering bulletin describing its latest type JS engines is offered

SE A CARD

FREE CATALOGS and LITERATURE

NEW PRODUCT INFORMATION

FORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

y Copper-Bessemer. It provides
ifications and description on
r complete line of 13-inch bore
16-inch stroke diesel, gas-die-
and spark-ignited gas engines.
MORE DATA CIRCLE NO. 31 ON REPLY CARD

lro-Pneumatic Boosters

iaky Bros. Inc.—Bulletin No.
10 covers Sciaky Hydro-pneu-
ic boosters, designed for opera-
with ordinary water and
h can be used with same suc-
with oil or nonflammable hy-
lic fluids. The bulletin covers
antages in the design and oper-
n of the boosters.
MORE DATA CIRCLE NO. 32 ON REPLY CARD

atings

eneral Ceramics Corp.—Cera-
coatings and porcelain ena-
s by General Ceramics are
ered in a 6-page brochure. Typ-
advantages are listed and
plete facilities are briefly cov-
d and illustrated.
MORE DATA CIRCLE NO. 33 ON REPLY CARD

ld, Core Machines

ettibone Mulliken Corp.—
rdsley & Piper Division offers
6-page bulletin illustrating and
cribing their line of mold and
e machines. It includes com-
e data, dimensional drawings
installation and operational
otos. Many of the machines
ered are completely new, others
e been fully redesigned.
MORE DATA CIRCLE NO. 34 ON REPLY CARD

of Decks

Vermiculite Institute — Fire-
of, insulated roof decks are
ered in three new technical fold-
. "Poured-In-Place Vermicu-
Concrete Over Vented Steel
of Decks" describes a recent
velopment that permits flexibil-
in joist spacing and slab thick-
ss. "Vermiculite Concrete Roof Decks Over Paper-Backed Wire Lathe," two folders, covers steel over concrete joist construction where the joist spacing does not exceed 32 inches on centers.
FOR MORE DATA CIRCLE NO. 35 ON REPLY CARD

Electric Trolleys

Feedrail Corp.—A 40-page bulletin illustrates and describes the track, trolleys and accessories used in safe electrification of light tonnage cranes and hoists, assembly and production lines, moving test lines, portable and machine tools.
FOR MORE DATA CIRCLE NO. 36 ON REPLY CARD

Roller Chains, Sprockets

Acme Chain Corp.—76 pages cover this company's line of roller chains and sprockets. Dimensions and list prices are given for each type of chain offered. The catalog is profusely illustrated.
FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Tabulating Card

Monarch Metal Products Inc.—This catalog covers tabulating card accessories for filing, moving, sorting and storing. The catalog describes new items heretofore not available as well as a redesign of a number of existing items. Its 47 pages are amply illustrated.
FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Surface Grinder

Thompson Grinder Co.—A 6-page catalog covers Thompson's type C surface grinder. Each of the controls is described, auxiliary equipment illustrated and specifications given. Clearance charts and floor plan are included. A schematic drawing identifies working parts of the grinder.
FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Hoist Classification Chart

Hydraulic Hoist & Steel Dump Body Mfrs. Association—A hoist

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT	PAGE

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

1	11	21	31	41	51	61	71	91
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

6-21-54

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STEEL
Penton Building
Cleveland 13, Ohio

Reader Service Dept.

classification chart is intended to provide a means of standardizing capacity ratings and as a convenient method for comparison of hoists manufactured by association members. Table determines size or rating of hoist needed, body dimensions and payload tonnage figures converted into required hoist class needed for given job.

FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

Abrasive, Cutting Tools

Metal Removal Co.—An "Abrasive and Cutting Tool Catalog" gives suggested abrasive grain selection and grain recommendations for specific jobs. A comprehensive tool selection chart shows advantages, disadvantages, applications and operating speeds for abrasives and for carbide, cast alloy and high speed steel cutting tools.

FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Comparator

Portman Instrument Co. — A new horizontal optical comparator, model L-400, is described in an 8-page bulletin. The optical system is explained and features of the multi-phase optical system given. The bulletin is amply illustrated. Accessories are also described and illustrated.

FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Tubing

Copperweld Steel Co. — Ohio Seamless Tube Division has prepared an 8-page brochure covering its line of seamless tubing, welded tubing and tubing facilities. Specifications for each type discussed are given. Examples of Ostuco fabrication facilities are also covered.

FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Solenoid Production Tools

Black & Webster Inc.—An illustrated catalog describing the company's line of solenoid-operated production tools is offered. It contains complete information on the Electropunch, Electropunch Jr., heavy-duty Electropunch, Electrostake, Electropress and accessories. Typical applications are shown.

FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

Furnace Catalog

R-S Furnace Corp.—"R-S Furnaces for Metal Heating and Heat Treatment," includes descriptions and applications of the following types of heat treating furnaces: Car hearth, rotary hearth, pot, roller hearth, belt, chain pusher and "Hi-Head." The latter is a unit of small cross section for rapid continuous handling of long, straight stock, regardless of length.

FOR MORE DATA CIRCLE NO. 45 ON REPLY CARD

EDITORIAL REPRINTS:

Distribution

Distribution may be the new industrial frontier whereby you can cut costs and expand sales. Up to half the retail price of many metal working products results from distribution charges. The fifth report in STEEL's Program for Management (page 113) gives you help in blazing a trail on that new frontier.

FOR MORE DATA CIRCLE NO. 46 ON REPLY CARD

Nondestructive Testing

This particular automaker relies heavily on a host of techniques including x-ray, radiography, magnetic particle, surface temper, dye penetrants for testing. The story beginning on p. 124 tells why testing people at Ford play a key role in in-process and end-product quality.

FOR MORE DATA CIRCLE NO. 47 ON REPLY CARD

Hot Lacquer

Fewer coats are needed by hot spraying improved formulations. Higher solid content accounts for better coverage. Lower viscosity is the result of heat. The story of Southeastern producer of auto body bodies who streamlined costs and speeded up production is on page 126.

FOR MORE DATA CIRCLE NO. 48 ON REPLY CARD

Quenching Fundamentals

Part III of the Heat Treating Series is found on page 128. It considers the isothermal process where metal is heated to bring constituents into stable solution then quenched at or above the critical rate at an elevated constant temperature as indicated by the TT curve.

FOR MORE DATA CIRCLE NO. 49 ON REPLY CARD

BUSINESS REPLY CARD

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1	11	21	31	41	51	61	71	81
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5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

6-21-54

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT — PAGE

NAME — TITLE

COMPANY

PRODUCT MANUFACTURED

ADDRESS

CITY AND STATE

Me? Ride to work on wire rope?

That's right. In the course of a year this young lady may travel as much as 150 miles with the aid of wire rope that safely and swiftly whisks her elevator aloft and then just as safely returns it to ground level.

It's quite likely that she gets to her job with an assist from Wickwire Rope. Here again—as in so many other fields where wire rope is used—men who manage and maintain the nation's tall buildings have learned to place unbounded faith in the safety and reliability they get from Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1854

WICKWIRE ROPE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

TOE CONTROL ELIMINATES KNEE ACTION

ELECTRIC FOOT SWITCH REDUCES FATIGUE - SPEEDS SHEARING

● The operator can slide the switch around the floor to wherever handiest to use. A mere touch of the toe and the knife is set in motion. Electric toe control is standard on all Steelweld Shears and furnished at no extra cost. It enables shearing speeds not attainable with ordinary foot treadles for many cutting operations.

● If you have spent a day at a shear with the old mechanical foot treadle, you know what knee action is. As the hours roll by it grows more and more tiresome, fatiguing, and production slips accordingly.

At last something has been done about it. Electric foot switches have been adopted as standard equipment for Steelweld Shears. Knee action has been replaced by fast easy toe control.

Toe control is one of many outstanding features you get on Steelweld Shears. These machines are in a class by themselves. Learn what they can do for you.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

7814 EAST 282ND STREET • WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

Market Outlook

YOU can count on steel demand and production being pretty good the rest of this year. The summer vacation period may slacken activity a little, but the effect won't be sharp.

Business can't help but be good with so much construction going on. You don't have depressions or even sharp recessions when that mainstay of business is at a high level.

SUSTAINED— What's more, construction is going to continue at a high rate. Contractors signed up more new business during May than ever before in that month. Those contracts will provide work and require materials over the next several months and, in some cases, into next year. A private agency keeping a record of construction says dollar volume of heavy construction contracts in May of this year was 33 per cent over that of the comparable month a year ago and 25 per cent above that of April of this year. The U. S. Departments of Commerce and Labor report that new construction put in place rose seasonally to a May record of $3.1 billion and made a new record for the first five months of $13.2 billion.

CAUSES— The record level of expenditures results from unprecedented activity in construction of office buildings, shopping and service establishments, schools, churches, public utility and water and sewer lines, and roads.

REFLECTIONS— The construction boom is reflected in steel shipments. Construction and contractors' products accounted for 20.1 per cent of all of the finished steel shipped by mills in April of this year, compared with 15.9 per cent in the like month of last year. Although mills' total April shipments were lower than they were last year, the increase in percentage to construction and contractors' products gave them almost as much tonnage as they got in April last year. The comparisons are: April of this year, 1,017,714 net tons; April of last year, 1,096,832.

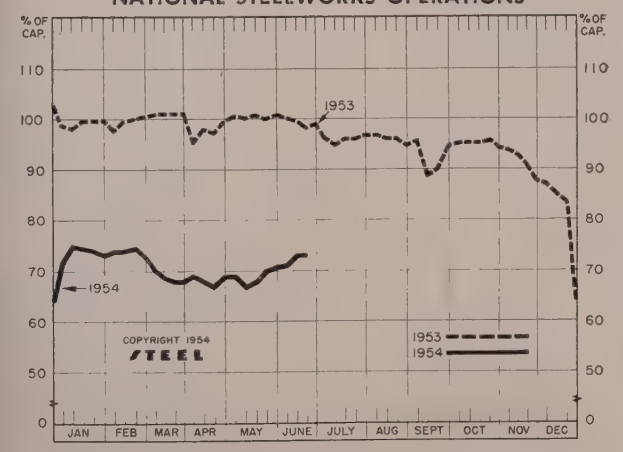
ANALYZED— Another way to see the construction boom is to analyze product shipments. Heavy structural shapes comprised 7.3 per cent of mill shipments of finished steel in April of this year, compared with 5.8 per cent in April of last year. Similarly, steel piling took 0.7 per cent, compared with 0.4 per cent, and reinforcing bars accounted for 2.8 per cent, compared with 2.2 per cent.

SOURCES OF BUSINESS— Not only will construction help support a good rate of steel business, but so will metal goods makers who will be coming back into the steel market upon completing liquidation of steel inventories. Too, the touchy international situation suggests that defense demand will not diminish; if anything, such demand may rise appreciably.

All of this indicates that employment the rest of the year will be high. People will have money to spend; they will be good customers of the metalworking industry.

OUTPUT RISES— Reflecting the underlying strength of business, steel ingot production in the week ended yesterday rose another half a point. The national average of output was 73.5 per cent, highest since mid-February. This marked the sixth consecutive week of increase.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended June 20	Change	Same Week 1953	Same Week 1952
Pittsburgh	70	0	98	2
Chicago	83.5	— 1.5*	104	7.5
Mid-Atlantic	59	+ 2	98	19
Youngstown	72	+ 4	90	0
Wheeling	82	— 6.5	99.5	51.5
Cleveland	71	— 0.5*	99.5	0
Buffalo	67.5	0	106.5	0
Birmingham	78	— 0.5	101	0.5
New England	50	— 2	85	23
Cincinnati	71	+ 1.5	95	58.5
St. Louis	72.5	0	99	30
Detroit	75	— 1.5	106	35
Western	85	0	108	33
National Rate	73.5	+ 0.5	98	12.5

INGOT PRODUCTION‡

	Week Ended June 20	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	109.1†	108.7	106.6	135.9
NET TONS (In thousands)	1,752†	1,746	1,712	2,183

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 65 Technical Outlook—p. 123

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended June 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complet description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400
Rails, light, 40 lb	5.767
Tie Plates	5.125
Axles, railway	7.250
Wheels, freight car, 33 in. (per wheel)	47.000
Plates, carbon	4.550
Structural Shapes	4.367
Bars, tool steel, carbon (lb)	0.415
Bars, tool steel, alloy, oil hardening die (lb)	0.505
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550
Bars, H.R., alloy	$8.575
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	4.873
Bars, reinforcing	4.900
Bars, C.F., carbon	7.974
Bars, C.F., alloy	10.975
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.755
Sheets, C.R., carbon	5.696
Sheets, galvanized	6.965
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	9.000
Strip, C.R., carbon	7.229
Strip, C.R., stainless, 430 (lb)	$0.415
Strip, H.R., carbon	4.963
Pipe, black, buttweld (100 ft)	14.454
Pipe, galv., buttweld (100 ft)	17.731
Pipe line (100 ft)	141.960
Casing, oil well, carbon (100 ft)	149.516
Casing, oil well, alloy (100 ft)	214.113
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon (100 ft)	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin plate, hot-dipped, 1.25 lb	$5.43
Tin plate, electrolytic, 0.25 lb	7.13
Black plate, can making quality	6.23
Wire, drawn, carbon	7.71
Wire, drawn, stainless, 430 (lb)	0.54
Bale ties (bundle)	5.65
Nails, wire, 8d common	7.48
Wire, barbed (80-rod spool)	6.84
Woven wire fence (20-rod roll)	16.17

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	June 15 1954	June 8 1954	Month Ago	May Average
(1947-1949=100)	140.9	140.9	140.8	140.8

STEEL's FINISHED STEEL PRICE INDEX*

	June 16 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.75	189.75	189.74	189.18	152.90
Index in cents per lb	5.140	5.140	5.140	5.125	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	June 16 1954	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Finished Steel, NT*	$113.20	$113.20	$133.70	$114.84	$91.8
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.0
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.6
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.2
Steelmaking Scrap, GT	27.83	28.17	28.33	43.42	21.2

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54 of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 16 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	4.15	3.35
Bars, H.R., Chicago	4.15	4.15	4.15	4.15	3.35
Bars, H.R., del. Philadelphia	4.405	4.405	4.405	5.302	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	5.20	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	4.10	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	4.10	3.25
Shapes, del., Philadelphia	4.38	4.38	4.38	4.38	3.492
Plates, Pittsburgh	4.10	4.10	4.10	4.10	3.40
Plates, Chicago	4.10	4.10	4.10	4.10	3.40
Plates, Coatesville, Pa.	4.10	4.10	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.10	4.10	4.10	4.10	3.40
Plates, Claymont, Del.	4.10	4.10	4.10	4.55	3.50
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.925	3.25
Sheets, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.975	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.275	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.425	3.25
Strip, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.45-5.95	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.70	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.45-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75

SEMIFINISHED STEEL					
Billets, forging, Pitts (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	June 16 1954	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.86
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.13	60.43	60.43	60.43	45.40
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.00

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$29.50	$29.50	$30.50	$40.50	$23.00
No. 1 Heavy Melt, E. Pa.	23.00	23.00	23.00	41.50	19.25
No. 1 Heavy Melt, Chicago	31.00	32.00	31.50	37.50	21.50
No. 1 Heavy Melt, Valley	29.50	29.50	29.50	42.50	22.00
No. 1 Heavy Melt, Cleve.	28.50	28.50	28.50	40.50	18.50
No. 1 Heavy Melt, Buffalo	26.50	26.50	25.50	40.75	19.75
Rails, Rerolling, Chicago	44.50	44.50	42.00	47.50	27.75
No. 1 Cast, Chicago	38.50	38.50	38.50	39.00	27.50

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.50
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	16.25
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.00-27.50 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del.; Fir refined 29.75 del.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, cor roding 13.90, St. Louis; N. Y. basis, add 0.20

Lithium: 98%, $11-$14 per lb, depending or quantity.

Magnesium: 99.8%, self-palletizing pig 27.00 notched ingot 27.75, 10,000 lb or more, f.o.b Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 fo ingot. Sticks, 1.3 in. diameter, 46.00, 100 t 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, and R 32.50; alloy M 34.50, 10,000 lb or mor f.o.b. Freeport, Tex., or Madison, Ill. Ad 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York $270-$275, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduce $3.40 per lb; pressed ingot $4.06 per lb sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in and larger), unpacked 60.00; 25-lb pigs 62.65 "XX" nickel shot 63.65; "F" nickel shot o ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price June 16	Last Change	Previous Price	May Avg.	Apr. Avg.	June 1953 Avg.
Copper	30.00	Apr. 12	29.75–30.00	30.000	29.955	29.875
Lead	13.80	June 15	14.05	13.800	13.710	13.213
Zinc	11.00	June 3	10.50	10.290	10.250	11.000
Tin	93.375	June 15	93.625	93.600	96.260	92.918
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

...b. Port Colborne, Ont., including import ...y. New York basis, add 0.92.
...ium: $140-$150 per troy oz nom.
...adium: $21 per troy oz.
...tinum: $84-$87 per troy oz from refineries.
...lium: $16-$21.50 per mg radium content, ...ending on quantity.
...odium: $125 per troy oz.
...henium: $70-$75 per troy oz.
...enium: 99.5%, $5-$6 per lb.
...dium: 16.50, carlots; 17.00 l.c.l
...talum: Sheet, rod $39.00 per lb; powder ...50 per lb.
...lurium: $1.75 per lb.
...allium: $12.50 per lb.
...: Straits, N. Y., spot and prompt, 93.375.
...anium: Sponge, 99.3+%, grade A-1 ductile 3% Fe max.) $4.72; grade A-2 (0.5% Fe ...x.) $4.46 per pound.
...ngsten: Powder, 98.8%, carbon reduced, ...00 lb lots $4.65 per lb f.o.b. shipping point; ...s than 1000 lb $4.80; 99+% hydrogen re...ced, $4.95. Treated ingots $6.70.
...c: Prime Western 11.00, brass special 11.25, ...ermediate 11.50, E. St. Louis, freight al...wed over 0.50 per pound. High grade 12.35, ...ecial high grade 12.50, die casting alloy ...got 15.00, del.
...reonium: Sponge $10 per lb; powder elec...onics grade $15, flash grade $11.50.
(Note: Chromium, manganese and silicon met...s are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

...uminum Ingots: Piston Alloy 19.00-20.00; ...2 12 foundry alloy (No. 2 grade) 18.75-...25; 5% silicon alloy, 0.60 Cu max., 20.00-...00; 13 alloy, 0.60 Cu max., 22.25-23.25; ...5 alloy 21.00-21.50; 108 alloy 19.25-20.25; ...el deoxidizing grades, notch bars, granu...ted or shot: Grade 1, 20.00-20.50; grade 2, ...50-19.00; grade 3, 17.75-18.25; grade 4, ...50-17.50.
...rass Ingot: Red brass, No. 115, 27.00; tin ...onze No. 225, 39.00; No. 245, 33.25; high-...aded tin bronze, No. 305, 31.50; No. 1 ...llow, No. 405, 23.25; manganese bronze No. ...1, 26.75.
Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, ...7.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

Base prices per lb, plus mill extras 2000 to ...000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be ...lloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

...are, soft, f.o.b. eastern mills, 100,000 lb lots, ...5.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weath...rproof, 100,000 lb, 36.28; 30,000 lb, 36.53; ...c.l. 37.03. Magnet wire del., 15,000 lb or ...ore 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, ...ittsburgh.) Sheets, full rolls, 140 sq ft or ...ore $19.00 per cwt; pipe, full coils $19.00 ...er cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) ...Sheets, $15; sheared mill plate, $12; strip, $15; ...wire, $11; forging billets, $6; hot-rolled and ...forged bars, $6.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets 23.00, ...ribbon zinc in coils, 19.50-20.50; plates 19.00-...22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 ...cent per linear foot.

	NICKEL, "A" Nickel	MONEL, Monel	INCONEL, Inconel
Sheet, C.R. ...	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.
Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.
Plate: Hot-rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in , lengths 60-192 in.
Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.50; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.
Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.
Lead: Heavy 10.75-11.25; battery plate 5.75-6.25; linotype and stereotype 13.00; electrotype 11.25; mixed babbitt 12.75.
Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.
Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 16.00-18.00; rods 23.00-25.00.
Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.
Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 45.00-50.00.
Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 14.75-15.25; 51S, 52S clippings 14.75-15.25; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 13.00-13.50; old sheet 12.00-12.50; old cast 12.00-12.50; clean old cable, free of steel 14.50-15.00; borings and turnings 12.50-13.00.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.
Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.75; auto radiators, 17.00-17.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass, No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.50; yellow brass turnings 16.00; radiators 17.50-17.75.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.75 per lb.
Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.
Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.
Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.
Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.
Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.
Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.
Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.
Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.
Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.
Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.
Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.
Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 57.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.
Stannous Chloride (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 1000-1900 lb $1.037; 200-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.
Stannous Sulphate: Less than 5 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.
Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	33.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90% ...	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5% ...	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

Red metal scrap exports may continue to harass scrap users in U. S. for some time. Defense needs of allied nations touched off present wave of foreign buying

EXPORTS of copper scrap may continue to be a thorn in the sides of domestic ingotmakers and refiners of secondary copper for some time. Currently, export buying of red metal scrap is quiet and has been for the last few weeks. But some indications point to a stronger demand from abroad, at least if strength of scrap metal prices is any criterion. These have been edging upward, with No. 2 heavy copper and wire now holding around 26.50c, f.a.s. New York, for early delivery.

Squeezed—Fact is, though, exporters have substantial commitments outstanding — commitments which should be cleaned up largely by mid-July—at prices higher than they now are willing to pay. They are making an effort to buy at prices being offered by domestic consumers, but they are having little luck. In the end they may have to shove their offerings higher to get the material. This may account more for the strong tone of the export market than any new feelers for tonnage.

Scrap copper supply now is moving in larger volume to custom smelters than in some months, and while prices are strong they are not being lifted, for the present at least, by higher offerings for tonnage for shipment abroad. Actually, with No. 2 heavy copper and wire at its present f.a.s. level, plus ocean freight and insurance, it is nearing a point where 30 cents for prime metal is beginning to bear down.

Started by Japan—Exports of red metal scrap began to reflect buoyancy last fall, with the sudden appearance of Japan in the market here for large tonnages. West Germany joined in, and, in a lesser degree, Italy, France and England, with the open-ending of exports by the government facilitating the movement to these countries.

Increase in these exports was appreciable in the third quarter of last year, shipments reaching a generally peak level in the fourth quarter of 1953 and first quarter of this year. Dollar shortages caused Japan, the major buyer, to cease buying in January, but shipments against old orders continued heavy, thus bolstering the foreign movement throughout the first three months.

Climbing — Movement of No. 1 heavy copper and wire and No. 2 heavy and light copper scrap to foreign consumers last year amounted to 66,900 net tons, or 6 per cent of all the scrap generated in these grades in this country during that period. In the first two months of this year 43,000 tons were shipped abroad, against 44,000 tons in the fourth quarter of 1953.

RED METAL SCRAP EXPORTS

(Net tons)

	Copper*	Alloy
1954		
First two months	43,000	20,000
1953		
4th Quarter	44,000	18,000
3rd Quarter	18,000	12,000
2nd Quarter	2,500	1,600
1st Quarter	2,400	1,700

*No. 1 heavy, No. 2 and light.

Exports of copper alloy scrap last year totaled 33,300 tons, or 30 per cent of such material generated in this country. In the first two months of 1954, shipments of copper alloy scrap amounted to 20,000 tons, compared with 18,000 tons in the fourth quarter of last year. Trend of shipments in detail is shown above.

Reactions—During much of this period consumers became squeezed and worried about getting sufficient supplies. Agitation by these consumers for export restrictions reached a climax in March, with special hearings in Washington, although nothing really ever came of it. By that time the downtrend in the movement of red metal scrap abroad had begun to set in, even though Japan and Germany subsequently acquired more dollars and created a flurry for a while, although they didn't buy on the previous scale.

Cleared Up—Further, there was a growing uncertaintly as to what action this country would take with regard to 180,000 tons of surplus Chilean electrolytic copper. Some thought the United States would pass it by and were predicting prices as low as 24.50c by June 1. But sentiment changed in early May when the government purchased 100,000 tons for stockpiling and later foreign consumers bought the remaining 80,000 tons. At least that load was taken off the market.

Present strength in the market should remain as long as the international situation continues tense. Actually, need for further building up of defense needs of allied nations, with the financial assistance of this country, was the spark that set off the heavy foreign buying of copper scrap last fall.

Metal Markets Holding Up

Predictions of little sag in the nonferrous metals during June and July are being borne out by market experience.

Domestic demand for copper remains strong and the price appears firmly stuck at 30.00 cents a pound. Heavy imports by European consumers are contributing to an increasingly tight supply here. For example, first-quarter figures show the U. S. supplied 8686 out of 20,835 tons of refined copper imported by West Germany and 14,374 out of 18,516 tons of copper and copper alloy scrap imported by West Germany.

Even the fizzle of the much-awaited stockpile call for lead produced no more than a ¼-cent drop to 14 cents, New York. General Services Administration flatly refused offerings of lead for stockpile priced at 14.25 cents a pound, the market price of two weeks ago. GSA refused a second offering after the ¼-cent drop again last week.

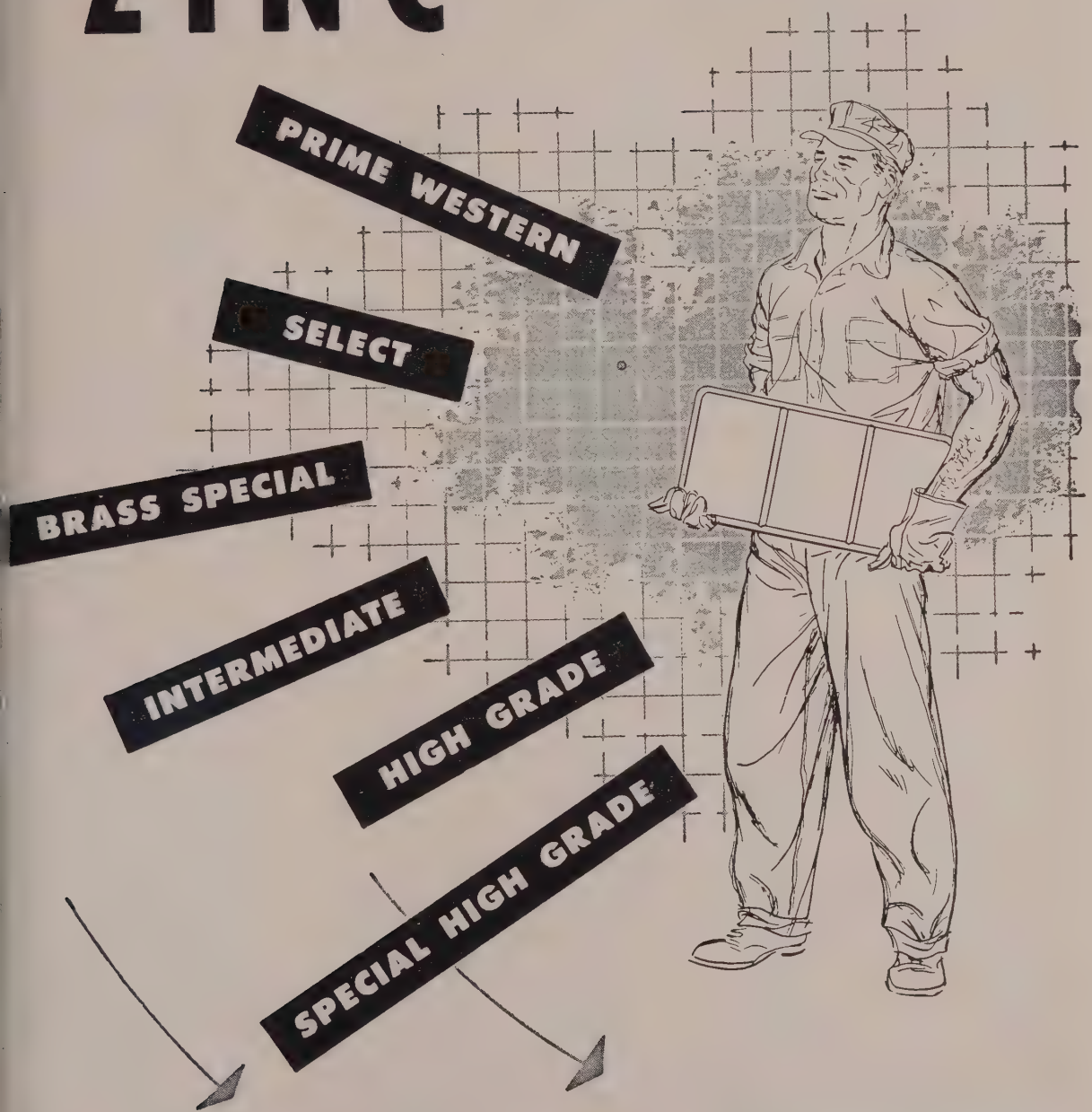
Zinc producers and smelters, in response to a separate invitation from GSA, offered twice as much metal, or more than the government accepted, for the stockpile. The price of zinc had just risen ½-cent to 11 cents, E. St. Louis, the week before. Yet the dissappointing take for the stockpile caused no price retreats though it did cause much consternation over what government policy would be on stockpiling.

Primary aluminum production continued its bullish way into May with output hitting a record 125,087 net tons for the month. Primary aluminum output totaled 594,590 net tons for the year through May, compared with 494,551 net tons for the same period in 1953.

The tin market has been quiet, and prices eased off late last week.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 189. Key to footnotes, page 191.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..80.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2..75.50
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14.75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ....82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14.82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ...$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 .....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 .....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 .....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
Kokomo,Ind. C16 ....4.625
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 .....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ..4.825

STRUCTURALS

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.70
Lackawanna, N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa, Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.80
Seattle B3 .....4.85
So.Chicago,Ill, U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.10

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....3.80
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L. A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ....6.175
Ind.Harbor,Ind. Y1 ....6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill, U5,W14,.6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L. A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

PILING

Bearing Piles
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky.(15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.10
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 .....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.25
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....3.85
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
LoneStar,Tex. L6 .....4.40
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14.4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1.4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.40
Fairfield,Ala. T2 .....6.25
Fontana,Calif(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ....6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ...6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill, U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland l.c.l. (15) A10..4.85
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.35
Bessemer,Ala. T2 .....4.15
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Chicago(31) R2 .....4.22
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.30
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ....4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14, P23 ...4.90
So.Chicago U5, W14 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3 ...4.90
Sterling,Ill. (1) N15 ....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.025
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2,Y1.4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2,U5,W14.4.875
So.Duquesne,Pa. U5 ...4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12 ..5.20
BeaverFalls,Pa. R2 ....5.26
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.27
GreenBay, Wis. F7 ....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 ....5.70
Harvey,Ill. B5 .....5.20
LosAngeles R2 ....6.65-6.96
LosAngeles S30 .....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R3 .....5.20
Massillon,O. R2 .....5.24
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa.(17) B4 ..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 ....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 ....6.325
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit R7 .....6.425
Detroit P17 .....6.175
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2,M13.6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2,W14.6.325
SpringCity,Pa. K3 ....6.50
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ..6.325

BARS, Reinforcing (fabricators)
AlabamaCity,Ala. R2 ...4.15
Atlanta A11 .....4.35
Birmingham,Ala. C15 ..4.15
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.00
Seattle B3, N14, P23...4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ...4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill.(1) N15 ....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2,U5 ....4.15

BARS, Reinforcing (Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.55
KansasCity S5 .....6.35
LosAngeles B3 .....5.80
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3, P23 .....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt, ½-1" B2 ..5.55
Williamsport,Pa. S19 ...5.45

RAIL STEEL BARS
Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.05
ChicagoHts.(4) C2, I-2..4.15
Ft.Worth,Tex.(26) T4 ..4.65
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O.(3) P11 ....4.15
Moline,Ill.(3) R2 .....4.15
Tonawanda(3,4) B12 ....4.15
Williamsport,Pa.(3) S19.4.25
Williamsport,Pa.(4) S19.5.45

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(S.R.) L5 ...10.40
McK.Rks.(D.R.) L5 ...14.00
McK.Rks.(Staybolt) L5.15.50

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.925
Allenport,Pa. P7 .....3.925
Ashland,Ky.(8) A10 ...3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..3.975
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....3.975
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.125
Ind.Harbor,Ind. I-2, Y1.3.925
Irvin,Pa. U5 .....3.925

omo,Ind. C16 .....4.025
awanna,N.Y. B2 ..3.925
hall,Pa. U5 .....3.925
port,Ky. N9 .....3.925
,O. N12 .....5.175
sburg,Calif. C11 ...4.625
sburgh J5 .....3.925
smouth,O. P12 ....3.925
rdale,Ill. A1 .....3.925
on,Pa. S3 .....3.925
hicago,Ill. W14 ..3.925
rrowsPoint,Md. B2.3.925
benville,O. W10 ..3.925
rance,Calif. C11 ...4.625
ren,O. R2 .....3.925
rton,W.Va. W6 ...3.925
ngstown U5, Y1 ...3.925

ETS H.R. (19 gage)

oamaCity,Ala. R2 ..5.225
er,O. R1 .....5.05
omo,Ind. C16 ....5.025
sfield,O. E6 .....5.05
s,O. N12 .....4.775
rance,Calif. C11 ..5.875

ETS, H.R. (14 ga. heavier)
igh-Strength Low-Alloy

veland J5, R2 .....5.90
shohocken,Pa. A3 ..5.90
rse,Mich. G5 .....6.05
rfield,Ala T2 .....5.90
rless,Pa. U5 .....5.95
tana,Calif. K1 ....6.675
y,Ind. U5 .....5.90
.Harbor,Ind. I-2 ....5.90
.Harbor,Ind. Y1 ....6.40
n,Pa. U5 .....5.90
kawanna(35) B2 ...5.90
nhall,Pa. U5 .....5.90
sburgh J5 .....5.90
ron,Pa. S3 .....5.90
Chicago,Ill. U5 .....5.90
rrowsPoint(36) B2 ..5.90
ren,O. R2 .....5.90
irton,W.Va. W6 ....5.90
ngstown U5 .....5.90
ngstown Y1 .....6.40

ETS, Hot-Rolled Ingot Iron
18 Gage and Heavier)

hland,Ky.(8) A10 ..4.175
veland R2 .....4.525
.Harbor,Ind. I-2 ..4.175
arren,O. R2 .....4.525

ETS, Cold-Rolled Steel
Commercial Quality)

enport,Pa. P7 .....4.775
eveland J5, R2 ....4.775
orse,Mich. G5 .....4.925
irfield,Ala T2 .....4.775
irless,Pa. U5 .....4.825
llansbee,W.Va. F4 ..4.775
ntana,Calif. K1 .....5.875
ry,Ind. U5 .....4.775
aniteCity,Ill. G4 ....4.975
.Harbor,Ind. I-2, Y1.4.775
in,Pa. U5 .....4.775
ckawanna,N.Y. B2..4.775
ddletown,O. A10 ....4.775
ttsburg,Calif. C11 ...5.725
ttsburgh J5 .....4.775
rtsmouth,O. P12 ....4.775
arrowsPoint,Md. B2..4.775
eubenville,O. W10 ...4.775
arren,O. R2 .....4.775
eirton,W.Va. W6 ....4.775
oungstown Y1 .....4.775

EETS, Cold-Rolled
High-Strength Low-Alloy

eveland J5, R2 .....7.225
corse,Mich. G5 .....7.375
irless,Pa. U5 .....7.275
ntana,Calif. K1 ....8.275
ary,Ind. U5 .....7.225
dianaHarbor,Ind. Y1.7.725
vin,Pa. U5 .....7.225
ackawanna(37) B2 ..7.225
ittsburgh J5 .....7.225
arrowsPoint(38) B2.7.225
arren,O. R2 .....7.225
eirton,W.Va. W6 ....7.225
oungstown Y1 .....7.725

EETS, Cold-Rolled Ingot Iron

leveland R2 .....5.375
iddletown,O. A10 ....5.275
arren,O. R2 .....5.375

EETS, Culvert	**Cu Alloy**	**Cu Fe**
shland,Ky. A10	6.325	....
anton,O. R2	..6.075	6.675
airfield T2	....6.075	6.325
ary,Ind. U5	...6.075	6.325
nd.Harbor I-2	..6.075	6.325
vin,Pa. U5	...6.075	6.325
okomo,Ind. C16	.6.175	....
artinsFry.,O.W10	6.075	....
itts.,Calif. C11	..6.825	....
arrowsPt. B2	..6.075	....
orrance,Cal. C11	7.075	....

EETS, Culvert	**Pure Iron**
shland,Ky. A10	....6.575
airfield,Ala. T2	.....6.325
artinsFerry,O. W10	...6.325

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 ..5.275
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield,Ala. T2 .....5.275
Gary,Ind. U5 .....5.275
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.275
Irvin,Pa. U5 .....5.275
Kokomo,Ind. C16 .....5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.275
Pittsburg,Calif. C11 ...6.025
SparrowsPoint,Md. B2.5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ...6.275
Weirton,W.Va. W6 ....5.275

SHEETS, Galvanized No. 10
High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron
No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825
Kokomo,Ind. C16 .....5.925
Niles,O. N12 .....5.825

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 .....5.275
Middletown,O. A10 ....5.275

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.575
Middletown,O. A10 ....5.575

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ...7.20
Follansbee(23) F4 ....6.425
Yorkville,O. W10 .....7.20

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.075

SHEETS, Well Casing

Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon

Ala.City.Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 .....3.925
Birmingham C15 .....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5 .4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.875
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 ...4.15
N.Tonawanda,N.Y. B11 3.925
Pittsburg,Calif. C11 ..4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill.. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3, P23 ...4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2..3.925
Torrance,Calif. C11 ....4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 .....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled
High-Strength Low-Alloy

Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ...5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3, P23 ....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G5 .....5.45
Baltimore T6 .....5.60
Bridgeport,Conn.(10)S15 5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....5.60
Detroit D2, M1 .....5.60
Detroit P20 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.60
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Indianapolis C8 .....5.60
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 ....5.45
NewBedford,Mass. R10..6.00
NewBritain(10) S15 ....5.45
NewCastle,Pa. B4, E5 ..5.45
NewHaven,Conn. A7 ...6.20
NewHaven,Conn. D2 ...5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(32) R6 .....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 .....5.45
Warren,O. B9, R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. A7 ....6.30
Youngstown C8, Y1 ....5.45

STRIP, Cold-Rolled Alloy Steel

Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.30
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2 ..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electrogalvanized

Dover,O. G6 .....5.45
Warren,O. B9, T5 .....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.70

TIGHT, COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U1 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport, Conn. (10) S15	5.45	7.65	8.60	10.55	12.85
Bristol, Conn. W1	...	...	8.90	10.85	....
Carnegie, Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Cleveland, O. C7	...	8.00	8.60	10.55	12.85
Dearborn, Mich. D3	5.60	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover, O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark, Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison, N.J. C18	...	...	8.90	10.85	13.15
Indianapolis C8	....	7.80	8.60	10.55	....
Mattapan, Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn., Conn. (10) S15.	5.45	7.65	8.60	10.55	12.85
NewCastle, Pa. B4	5.45	7.65	8.60	....	....
NewCastle, Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven, Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket, R.I. (11) N8	..	7.65	8.60	10.55	12.85
Pawtucket, R.I. (12) N8	6.10	7.95	8.90	10.85	13.15
Sharon, Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton, N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford, Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren, O. T5	5.45	7.65	8.60	10.55	12.85
Weirton, W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester, Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester, Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol, Conn. W1	...	...	12.50	15.00	....
Buffalo W12	...	...	12.50	....	....
FranklinPark, Ill. T6	...	...	13.25	15.75	18.75
Harrison, N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton, N.J. R5	...	...	12.50	15.00	18.00
Worcester, Mass. T6	...	...	12.50	15.00	18.00
Worcester, Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge, Pa. A4	...	...	8.75	9.75	10.65
IndianaHarbor, Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield, O. E6	7.85	8.15	8.75	9.75	10.65
Newport, Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles, O. N12	7.85	8.15	8.75	9.75	....
Vandergrift, Pa. U5	...	8.15	8.75	9.75	10.65
Warren, O. R2	7.85	8.15	8.75	9.75	....
Zanesville, O. A10	...	8.15	8.75	9.75	10.65

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity, Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor, Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift, Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren, O. R2	8.05†	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge, Pa. A4	11.60	....	....	....
Newport, Ky. N9	11.60	....	....	....
Vandergrift, Pa. U5	11.60	12.15	12.65	13.65
Zanesville, O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler, Pa. A10	....	....	16.25	16.75	....
Vandergrift, Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren, O. R2	....	....	....	....	12.35‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.40	$7.65	$8.05
Fairfield, Ala. T2	7.50	7.75	8.15
Fairless, Pa. U5	7.50	7.75	8.15
Gary, Ind. U5	7.40	7.65	8.05
GraniteCity, Ill. G4	7.60	7.85	8.25
IndianaHarbor, Ind. I-2, Y1	7.40	7.65	8.05
Irvin, Pa. U5	7.40	7.65	8.05
Niles, O. R2	7.40	7.65	8.05
Pittsburg, Calif. C11	8.15	8.40	8.80
SparrowsPoint, Md. B2	7.50	7.75	8.15
Weirton, W.Va. W6	7.40	7.65	8.05
Yorkville, O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$8.70	$8.95
Fairfield, Ala. T2	8.80	9.05
Fairless, Pa. U5	8.80	9.05
Gary, Ind. U5	8.70	8.95
Ind. Har. I-2, Y1	8.70	8.95
Irvin, Pa. U5	8.70	8.95
Pitts., Cal. C11	9.45	9.70
Sp. Pt., Md. B2	8.80	9.05
Warren, O. R2	8.70	8.95
Weirton, W.Va. W6	8.70	8.95
Yorkville, O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa, Pa. J5	$6.50
Fairfield, Ala. T2	6.60
Fairless, Pa. U5	6.60
Gary, Ind. U5	6.50
GraniteCity, Ill. G4	6.70
Ind. Harbor, Ind. I-2, Y1	6.50
Irvin, Pa. U5	6.50
Niles, O. R2	6.50
Pittsburg, Calif. C11	7.25
SparrowsPoint, Md. B2	6.60
Warren, O. R2	6.50
Weirton, W.Va. W6	6.50
Yorkville, O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee, W.Va. F4	6.10
Gary, Ind. U5	6.10
GraniteCity, Ill. G4	6.30
Ind. Harbor, Ind. Y1	6.10
Irvin, Pa. U5	6.10
Yorkville, O. W10	6.10

MANUFACTURING TERNES (Special Coated)	
Fairfield, Ala. T2	$7.85
Gary, Ind. U5	7.75
Irvin, Pa. U5	7.75
Yorkville, O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary, Ind. U5	$9.75
Yorkville, O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville, O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary, Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity, Ala. R2	5.525
Aliquippa, Pa. J5	5.525
Alton, Ill. L1	5.70
Atlanta A11	5.725
Bartonville, Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville, Ind. M8	5.625
Donora, Pa. A7	5.525
Duluth, Minn. A7	5.525
Fairfield, Ala. T2	5.525
Fostoria, O. (24) S1	5.75
Houston S5	5.925
Jacksonville, Fla. M8	6.05
Johnstown, Pa. B2	5.525
Joliet, Ill. A7	5.525
KansasCity, Mo. S5	6.125
Kokomo, Ind. C16	5.625
LosAngeles B3	6.475
Minnequa, Colo. C10	5.775
Monessen, Pa. P7	5.525
No. Tonawanda B11	5.525
Palmer, Mass. W12	5.825
Pittsburg, Calif. C11	6.475
Portsmouth, O. P12	5.525
Rankin, Pa. A7	5.525
So. Chicago, Ill. R2	5.525
So. SanFrancisco C10	6.475
SparrowsPoint, Md. B2	5.625
Sterling, Ill. (1) N15	5.525
Struthers, O. Y1	5.525
Waukegan, Ill. A7	5.525
Worcester, Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa, Pa. J5	6.925
Alton, Ill. L1	7.10
Bartonville, Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora, Pa. A7	6.925
Duluth, Minn. A7	6.925
Fostoria, O. S1	6.925
Johnstown, Pa. B2	6.925
LosAngeles B3	7.875
Milbury, Mass. (12) N6	7.225
Minnequa, Colo. C10	7.175
Monessen, Pa. P7, P16	6.925
Muncie, Ind. I-7	7.125
Palmer, Mass. W12	7.225
Pittsburg, Calif. C11	7.875
Portsmouth, O. P12	6.925
Roebling, N.J. R5	7.225
So. Chicago, Ill. R2	6.925
So. SanFran. C10	7.875
SparrowsPt., Md. B2	7.025
Struthers, O. Y1	6.925
Trenton, N.J. A7	7.225
Waukegan, Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa, Pa. J5	6.625
Alton, Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora, Pa. A7	6.625
Duluth, Minn. A7	6.625
Johnstown, Pa. B2	6.625
LosAngeles B3	7.575
Minnequa, Colo. C10	6.80
Monessen, Pa. P7, P16	6.625
NewHaven, Conn. A7	6.925
Palmer, Mass. W12	6.925
Pittsburg, Calif. C11	7.575
Portsmouth, O. P12	6.625
Roebling, N.J. R5	6.925
So. Chicago, Ill. R2	6.625
So. SanFrancisco C10	7.575
SparrowsPoint, Md. B2	6.725
Trenton, N.J. A7	6.925
Waukegan, Ill. A7	6.625
Worcester, Mass. A7	6.925

WIRE, Fine & Weaving (8" Coils)	
Alton, Ill. L1	10.75
Bartonville, Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville, Ind. M8	10.65
Fostoria, O. S1	10.55
Jacksonville, Fla. M8	11.08
Johnstown, Pa. B2	10.55
Kokomo, Ind. C16	10.55
Minnequa, Colo. C10	10.30
Monessen, Pa. P16	10.55
Muncie, Ind. I-7	10.75
Palmer, Mass. W12	10.85
Roebling, N.J. R5	10.85
So. SanFrancisco C10	10.90
Waukegan, Ill. A7	10.55
Worcester, Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville, Ill. K4	9.50
Buffalo W12	9.50
Johnstown, Pa. B2	9.50
Minnequa, Colo. C10	9.625
Monessen, Pa. P16	9.50
Muncie, Ind. I-7	9.70
Portsmouth, O. D2	9.50
Roebling, N.J. R5	9.80
SparrowsPt., Md. B2	9.60

ROPE WIRE	(A)
Alton, Ill. L1	9.45
Bartonville, Ill. K4	9.35
Buffalo W12	9.35
Fostoria, O. S1	9.35
Johnstown, Pa. B2	9.35
Monessen, Pa. P7, P16	9.35
Muncie, Ind. I-7	9.55
Palmer, Mass. W12	9.65
Portsmouth, O. P12	9.35
Roebling, N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers, O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Alton, Ill. L1	12.75
Bartonville, Ill. K4	12.65
Monessen, Pa. P16	12.55
Roebling, N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson, Ind. G6	7.45
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville, Ind. M8	7.55
Dover, O. G6	7.45
Fostoria, O. S1	7.45
Kokomo, Ind. C16	7.55
FranklinPark, Ill. T6	7.60
Massillon, O. R8	7.45
Monessen, Pa. P7, P16	7.45
Pawtkt., R.I. (12) N8	7.75
Trenton, N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala. City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville (48) K4	6.775 7.30
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ....
Crawfordsville M8	6.775 7.30
Donora, Pa. A7	6.675 7.075†
Duluth, Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston, Tex. S5	7.075 7.475
Jacksonville, Fla. M8	7.20 7.73
JohnstownB2 (48)	6.675 7.225*
Joliet, Ill. A7	6.675 7.075†
KansasCity, Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ....
Minnequa C10	6.925 7.325**
MonessenP7 (48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts., Calif. C11	7.625 8.025†
Portsmouth, O. P12	6.675 ....
Rankin A7	6.675 7.075†
So. Chi'go R2	6.675 7.075**
S.S. Frn. (48) C10	7.625 8.025**
Spar'wsPt. B2 (48)	6.775 7.325*
Sterl'g (1) (48) N15	6.675 7.20
Struthers, O. Y1	6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga. Col.	
Ala. City, Ala. R2	140**
Ala. City, 17 ga. R2	235**
Ala. City, 18 ga. R2	245**
Aliq'ppa, Pa. 9-14½ga. J5	143*
Atlanta A11	145
Bartonville, Ill. K4	145
Crawfordsville, Ind. M8	145
Donora, Pa. A7	140†
Duluth, Minn. A7	140†
Fairfield, Ala. T2	140†
Houston, Tex. S5	148
Johnstown, Pa. B2	143
Johnstown 17 ga., 6" B2	234
Johnstown 4" B2	237
Joliet, Ill. A7	140†
KansasCity, Mo. S5	152
Kokomo, Ind. C16	142†
Minnequa, Colo. C10	148**
Monessen, Pa. 9 ga. P7	145
Pittsburg, Calif. C11	163†
Rankin, Pa. A7	140†
So. Chicago, Ill. R2	140**
Sterling, Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity, Ala. R2	149
Atlanta A11	151
Bartonville, Ill. K4	151
Crawfordsville, Ind. M8	151
Donora, Pa. A7	149
Duluth, Minn. A7	149
Fairfield, Ala. T2	149
Joliet, Ill. A7	149
KansasCity, Mo. S5	161
Kokomo, Ind. C16	151
Minnequa, Colo. C10	154
Pittsburg, Calif. C11	173
So. Chicago, Ill. R2	149
So. SanFran., Calif. C10	...
SparrowsPoint, Md. B2	...
Sterling, Ill. (1) N15	...

WIRE, Barbed	Co
AlabamaCity R2	153
Aliquippa J5	15
Atlanta A11	1
Bartonville, Ill. K4	1
Crawfordsville, Ind. M8	1
Donora, Pa. A7	15
Duluth, Minn. A7	15
Fairfield, Ala. T2	15
Houston, Tex. S5	1
Johnstown, Pa. B2	15
Joliet, Ill. A7	15
KansasCity, Mo. S5	1
Kokomo, Ind. C16	15
Minnequa, Colo. C10	159
Monessen, Pa. P7	1
Pittsburg, Calif. C11	17
Rankin, Pa. A7	15
So. Chicago, Ill. R2	153
S. SanFrancisco C10	176
SparrowsPoint, Md. B2	15
Sterling, Ill. (1) N15	1

† Based on 5c zinc; * 1 zinc; ** Subject to zi equalization extras.

WIRE (16 gage)	An'ld. Gal Stone	Sto
Ala. City R2	12.50	14.05
Aliquippa J5	12.50	14.3
Bartonville K4	12.60	14.
Buffalo W12	12.50	..
Cleveland A7	12.50	..
Crawfordsville M8	12.50	14.
Fostoria, O. S1	12.60	14.
Johnstown B2	12.50	14.3
Kokomo C16	12.60	14.1
Minnequa C10	12.75	14.45
Palmer, Mass. W12	12.50	14.0
Pitts., Calif. C11	12.85	14.4
SparrowsPt. B2	12.60	14.4
Sterling (1) N15	12.50	14.
Waukegan A7	12.50	14.0
Worcester A7	12.80	....

* Based on 11c zinc; † zinc; ** Subject to zi equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Co
AlabamaCity, Ala. R2	1
Aliquippa, Pa. J5	1
Atlanta A11	1
Bartonville, Ill. K4	1
Chicago, Ill. W13	1
Cleveland A9	1
Crawfordsville, Ind. M8	1
Donora, Pa. A7	1
Duluth, Minn. A7	1
Fairfield, Ala. T2	1
Galveston, Tex. D7	1
Houston, Tex. S5	1
Johnstown, Pa. B2	1
Joliet, Ill. A7	1
KansasCity, Mo. S5	1
Kokomo, Ind. C16	1
Minnequa, Colo. C10	1
Monessen, Pa. P7	1
Pittsburg, Calif. C11	1
Rankin, Pa. A7	1
So. Chicago, Ill. R2	1
SparrowsPt., Md. B2	1
Sterling, Ill. (1) N15	1
Worcester, Mass. A7	1

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken, Pa. A3	$8.
Wheeling, W.Va. W10	8.

STAPLES, Polished Stock To dealers & mfrs. (7)	Co
AlabamaCity, Ala. R2	1
Aliquippa, Pa. J5	1
Atlanta A11	1
Bartonville, Ill. K4	1
Crawfordsville, Ind. M8	1
Donora, Pa. A7	1
Duluth, Minn. A7	1
Fairfield, Ala. T2	1
Johnstown, Pa. B2	1
Joliet, Ill. A7	1
Kokomo, Ind. C16	1
Minnequa, Colo. C10	1
Monessen, Pa. P7	1
Pittsburg, Calif. C11	1
Rankin, Pa. A7	1
So. Chicago, Ill. R2	1
SparrowsPt., Md. B2	1
Sterling, Ill. (1) N15	1
Worcester, Mass. A7	1

FENCE POSTS

	Co
ChicagoHts., Ill. C2 I-2	1
Duluth, Minn. A7 (49)	1
Franklin, Pa. F5	1
Johnstown, Pa. B2	1
Marion, O. P11	1
Minnequa, Colo. C10	1
Moline, Ill. R2	1
So. Chicago, Ill. R2	1
Tonawanda, N.Y. B12	1
Williamsport, Pa. S19	1

AMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

—Inches	2		2½		3		3½		4		5		6	
t Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
nds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
quippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
bridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	....
ain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
ngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

ngstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

TTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

e—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
t Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
nds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
quippa, Pa. J5 (‡)	...	...	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
on, Ill. L1 (§)	...	...	....	....	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
awood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
tler, Pa. F6	26.5	—1.75	19.5	+2.75	12.5	+6.25	...	..	....	...	....	...	....	....	....	....
na, Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
irless, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
ntana, Calif. K1 (§)	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
t. Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
rain, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
aron, Pa. S4 (‡)	26.5	list	19.50	+4.00	12.5	+9	....	..	....	..	....	....	....	....	....	....
aron, Pa. M6	...	...	....	...	....	....	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
arrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
ungstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20	34.75	21
ungstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5
heatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5

e—Inches	2		2½		3		3½		4	
t Per Ft	37c		58.5c		76.5c		92c		$1.09	
unds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
quippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
on, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
awood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
na, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
irless, Pa. N3	33.25	....	34.75	....	34.75	...	25.75	....	25.75	....
ntana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
t. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
rain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
aron, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
arrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
ungstown R2 (**)	35.25	21.5	36.75	21	36.75	21	27.75	11.5	27.75	11.5
ungstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
heatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; †), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment.

OILER TUBES

et base c.l. prices, dollars per 100 ft, mill; minimum all thickness, cut length 10 to 24 ft, inclusive.

D.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
.....	13	....	19.02	18.44
¼	13	....	22.53	18.12
⅜	13	20.65	24.91	20.01
½	13	24.40	29.43	23.66
.....	13	27.34	32.98	26.51
⅝	13	30.80	37.15	29.86
¾	12	33.43	40.32	32.41
⅞	12	36.82	44.41	35.70
1	12	39.87	48.09	38.66
.....	12	42.52	51.28	41.23

AILWAY MATERIALS

AILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
essemer, Pa. U5	4.325	4.225	4.275	5.20
nsley, Ala. T2	4.325	4.225	....	5.20
airfield, Ala. T2	...	...	....	5.20
ary, Ind. U5	4.325	4.225	4.275	...
untington, W.Va. W7	...	...	....	5.20
diana Harbor, Ind. I-2	4.325	4.225	4.275	...
hnstown, Pa. B2	...	...	....	(16)5.20
ckawanna, N.Y. B2	4.325	4.225	....	5.20
innequa, Colo. C10	4.325	4.225	....	5.70
eelton, Pa. B2	4.325	4.225	....	...
illiamsport, Pa. S19	....	....	....	5.20

E PLATES

airfield, Ala. T2	5.125
ary, Ind. U5	5.125
d. Harbor, Ind. I-2	5.125
ckawanna, N.Y. B2	5.125
innequa, Colo. C10	5.125
ittsburg, Calif. C11	5.275
attle B3	5.275
eelton, Pa. B2	5.125
rrance, Calif. C11	5.275

RACK BOLTS (20) Treated

leveland R2	11.00
ansas City, Mo. S5	11.00
ebanon, Pa. B2	11.00
innequa, Colo. C10	11.00
ittsburg 03, P14	11.00
eattle, Wash. B3	11.50

OINT BARS

essemer, Pa. U5	5.275
airfield, Ala. T2	5.275
d. Harbor, Ind. I-2	5.275
liet, Ill. U5	5.275
ckawanna, N.Y. B2	5.275
innequa, Colo. C10	5.275
eelton, Pa. B2	5.275

KLES

d. Harbor, Ind. S13	6.50
hnstown, Pa. B2	6.50

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 4
- ⅝-in. & ⅝-in. 5
- ¾-in. and larger 3

Longer than 6 in.: All diameters +4

Lag bolts, all diams.:
- 6 in. and shorter 12
- Over 6 in. long 8

Ribbed Necked Carriage 5

Blank 25

Plow 25

Step, Elevator, Tap and Sleigh Shoe 12

Tire Bolts List

Boiler & Fitting-Up Bolts 23

NUTS

H.P. and C.P., regular & heavy:
- Square, all sizes 58

H.P., Hex, regular & heavy:
- ¾" and smaller 58
- ⅞" to 1¼", inclusive. 60
- 1⅛" to 1½", inclusive 62
- 1⅝" and larger 58

C.P. Hex regular & heavy:
- All sizes 58

Hot Galv. Nuts (all types):
- ¾" and smaller 40
- ⅞" to 1½", inclusive. 43

Finished Hex Nuts:
- New standard, all sizes 58

Semifinished & Slotted Hex:
- Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 34

1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 34

¼ in. diam & larger 14

N.F. thread, all diams. 8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish 47.5 x 10

Plated finishes 30 x 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 38
- ¾-in. through 1 in. 22

Longer than 6 in.:
- ⅝-in. and smaller 20
- ¾-in. through 1 in. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge Iron: Cents
- 98+% Fe, annealed. 18.00

Unannealed
- Minus 100 mesh 14.50
- Minus 35 mesh 10.50
- Minus 20 mesh 10.00

Swedish, c.l.f. N. Y., c.l., in bags 11.25

Domestic (Swedish), f.o.b. Riverton, N. J., in bags 11.25

Electrolytic iron:
- Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in. 23.00
- Annealed, 99.5% Fe. 42.50
- Unannealed (99+% Fe) 36.50
- Unannealed (99+% Fe) (minus 325 mesh) 53.50

Powder Flakes (minus 16, plus 100 mesh) 31.00

Carbonyl Iron:
- 97.9-99.8% size 5 to 10 microns. .83.00-148.00

Aluminum:
- Atomized, 500 lb drums, frgt. allowed: Carlots 31.00; Ton lots 34.00

Antimony, 500 lb lots 32.00*

Brass, ¼-ton lots .28.75-37.50†

Bronze, ¼-ton lots .50.00-60.00‡

Copper:
- Electrolytic .13.50*
- Reduced .13.50*

Lead 7.50*

Magnesium .54.00-56.00

Manganese:
- Minus 35 mesh 61.00
- Minus 100 mesh 67.00
- Minus 200 mesh 72.00

Nickel, unannealed 89.50

Nickel-Silver, ¼-ton lots .44.00-49.00§

Nickel-Silver, ¼-ton lots .46.75**

Phosphor-Bronze, ¼-ton lots 58.50

Silicon 43.50

Solder 8.50*

Stainless Steel, 302 91.00

Tin .14.50*

Zinc, ¼-ton lots .15.00-28.75‡

Tungsten Dollars
- Melting grade, 99% 60 to 200 mesh: 1000 lb and over 4.95; Less than 1000 lb 5.10

Chromium electrolytic 99.9% Cr min. 3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Sn. **64% Cu, 18% Zn, 18% Sn.

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.05
Ind. Harbor, Ind. I-2, Y1	7.05
Kansas City, Mo. S5	7.30
Lebanon, Pa. B2	7.05
Minnequa, Colo. C10	7.05
Pittsburgh J5	7.05
Seattle B3	7.55
So. Chicago, Ill. R2	7.05
Struthers, O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c

⅞-in. under 26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers List

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.025"; 0.025" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	56.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.875
18.25	4.25	1	4.75	...	2.160-2.320
18	4	2	9	...	2.515
18	4	2	....	...	1.640
18	4	1	....	...	1.480
13.5	4	3	....	...	1.735
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	...	0.495
1.5	4	1	....	8.5	0.865-0.895

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.75	61.25	61.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

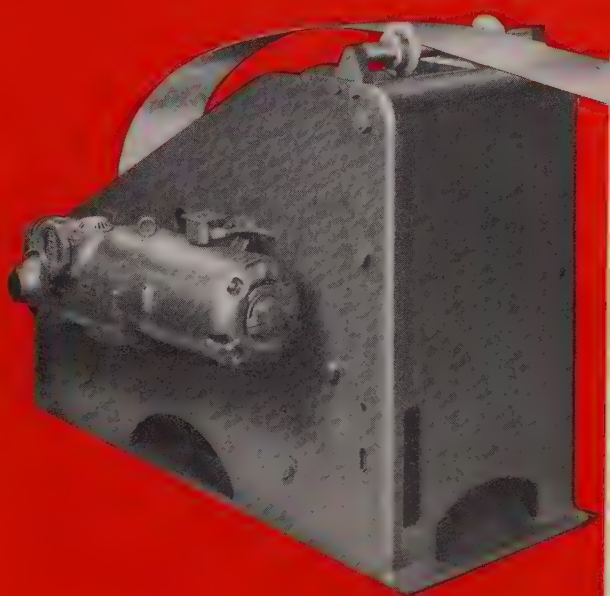
LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00

No child's play, this business of properly applying electric motor drives. But you'll find it much easier if you can line up exactly the features you need in one compact, integrally built power unit.

And nowhere will you find a wider selection of sizes and types of electric motors, gearmotors, variable speed drives, fluid-drives, electric brakes, etc., than Master has to offer . . . and they're all designed so they easily combine into a power drive that's just right for each job.

Use Master power drives to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment.



THE MASTER ELECTRIC COMPANY

DAYTON 1, OHIO

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Erie, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.20	7.12	7.78	....	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	....	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	44.78	7.13	...	6.87	8.35	12.13	7.06	7.13	8.26
Buffalo	6.11	7.10	8.65	....	6.50	...	6.27	7.65	11.97	6.49	6.45	7.80
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	7.95	....	6.42	...	6.28	7.30	11.60	6.46	6.33	7.46
Cincinnati	6.30	7.11	8.00	50.80	6.66	...	6.52	7.60	11.85	6.93	6.62	7.71
Cleveland	6.18	7.12	8.25	45.74	6.58	...	6.34	7.40	11.74	6.79	6.50	7.63
Detroit	6.38	7.29	8.22	....	6.69	7.36	6.56	7.60	11.97	6.91	6.80	7.80
Erie, Pa.	6.15	...	8.25	....	6.45	...	6.28	7.25[4]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	....	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	9.00	8.85	50.15	7.55	11.20	7.15	9.10	12.90	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.12	....	6.59	...	6.45	7.57	11.77	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.30	....	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.78	7.52	8.37	44.15	7.16	...	7.06	8.43[6]	11.99	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	....	7.00	...	7.00	8.50	....	7.00	7.00	7.85
Philadelphia	6.35	7.13	7.87	....	7.02	8.80	6.87	8.19[6]	11.74	6.67	6.63	7.66**
Pittsburgh	6.18	7.12	8.00	50.50	6.55	...	6.28	7.65	11.60	6.46	6.33	7.46**
Portland, Oreg.	7.60	8.45	9.05	....	7.65	...	7.35	10.65	....	7.25	7.25	9.15
Richmond, Va.	6.50	...	8.67	....	7.10	...	7.05	8.20	....	7.10	6.85	8.20
St. Louis	6.48	7.42	8.25	43.89	6.72	...	6.58	7.70	11.90	6.86	6.73	7.86
St. Paul	6.84	7.78	8.61	....	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	8.95	50.15	7.60	...	7.15	9.75	12.90	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	50.50	8.00	...	7.60	10.65	13.35	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	....	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	....	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.

Competition Keener at Warehouse Level

Distributors strive to hold volume at May level through booking of numerous small orders. Offerings of wasters and secondary material sharpens price bargaining

New York—Volume with steel warehouses is barely holding to the May average. Not in recent years has business been so competitive, both service and pricewise. Hand-to-mouth buying holds down size of orders for alloys and standard carbon products.

Bulk of bookings on most products is under base quantities. Average shipment of stainless steel is 1000 to 1500 pounds against 10,000-pound base for 302 stainless sheets.

Although below capacity, flame-cutting and other fabricating equipment is operated slightly heavier than the general shop level.

Distributors are holding mill purchases to replacements for prompt shipment.

Cleveland—Local warehouses are booking a fair number of orders but individual lots are much smaller than they used to be. Larger orders are going to the mills which can give relatively prompt shipment on most product categories. June order volume of the distributors is expected to hold about on a par with that for May, but July and August totals will likely be adversely affected by the vacation shutdowns of manufacturing plants. Competition continues keen, especially in sheets, which product is affected by offerings of low-priced seconds.

Pittsburgh—Large and small distributors report sales held a straight line through May and early June. All indications point to gathering strength in prices and more stability in demand.

Small improvements in sheet and strip sales are traced to "hedge buying". Generally sheet sales are slow. Fabricators continue to fill most of their requirements at mills.

Chicago—Warehouse steel sales are not up to expectations although they are fairly well up to the pace of the last two months. From now until Labor Day substantial pickup doesn't appear likely because it is the vacation period and customarily less

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.75	$4.70	$5.03
Bar Size Angles	4.50	4.50	4.40	4.73
Structural Angles	4.50	4.50	4.40	4.73
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.03
Sheet and Plate, 10 gage, 11 gage, 5′ x 10′	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.75	6.75	6.75	7.08
Merchant Bars	6.75	4.75	4.70	5.03
Hot-Rolled Bands	4.90	4.90	4.85	5.18
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.61/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

ive. Stainless sheets are doing bet- than any other product because so long a period this material s restricted in use. Wide flange apes are holding reasonably well so.

Boston—Competition with wasters d secondary material sharpens ice bargaining for prime carbon t-rolled material. Slit sheets are so making inroads on the limited rbon cold-rolled strip volume and mbination small orders placed di- ct with mills hurts warehouse les totals.

Incoming orders with distributors, nall individually, are often under se quantities, and consumers to at extent are paying high prices r fill-in lots. Warehouse inven- ries are slowly getting into bal- ice but in most cases will not be quidated to the level expected by ily 1.

Philadelphia — Warehouse business dragging, though this may be as- ibed in part to seasonal influences. s of the moment, most distributors ok for trading in June to be down om May. In general, prices are un- anged but on the easy side. One arehouse is offering bargain prices n odd sizes of various hot carbon roducts laid in during the steel tringency and not fully worked off. lere and there shading of extras is till being noted. Meanwhile, there is ss trading in the secondary grades f hot and cold sheets and galvanized, rimarily because sellers have less onnage to dispose of. Earlier in the ear they received a considerable mount from the mills, but have since old more than they have been get- ing in.

Seattle—Warehouses are surprised by the lack of activity. Construction s extensive in this area. Public works are numerous. But the volume of steel sales is below normal. Buyers' nventories are low and still the ex- pected buying movement has not appeared.

San Francisco—Volume is steadily mounting and distributors feel opti- mistic concerning the immediate out- look. Some building up of inven- tories among users is noted. Two possible reasons are advanced for this: Hedges against a possible strike and against the likelihood of a steel price boost in event wages rise.

Los Angeles—Although June ware- house activity is steady at the May level, distributors fear vacation close- downs will restrict summer buying. Most products remain in ample sup- ply, with swollen sheet inventories slightly reduced over those on hand at warehouses in May.

Mild Flurry in Sheet Demand Continues

Buying is not spirited and producers anticipate little change in market situation before late summer. Activity seen noticeably improved by fall

Sheet and Strip Prices, Page 188 & 189

Cleveland—Sheet makers do not anticipate much change in demand until well through third quarter. Recently, buying has been a little more active but, for the most part, consumers are ordering on a month-to-month basis. With the vacation season just ahead sellers anticipate a slump in ordering extending through the month of July. Late summer pickup is expected to be substantial, gaining in volume as the fall advances and fourth quarter manufacturing schedules are established.

There has been relatively little hedge buying as protection against strike interruption. The same is true with respect to buying against a price advance.

Effective with shipments June 10, Republic Steel Corp. adopted new size extras on widths under 24-inch to ½ inch, on its electro paintlok and electro zincbond sheets. Previously, material in this range has been priced as cold-rolled strip plus certain coating extras. Since the narrow widths are obtained by slitting from wider coils, Republic officials say the new size extras more properly reflect actual mill costs.

In addition, Republic announced some minor adjustments in certain size extras between 24-inch and 36-inch. It also announced a change in trade name terminology. Hereafter, all electro zincplated sheets, regardless of gage, that are chemically treated at the mill for paint adherence will be known as electro paintlok. Those sheets not chemically treated and heretofore sold under the trade name nevapeel, will be sold under the trade name zincbond, the nevapeel term being discontinued. No changes in manufacturing processes or coating weights are involved.

The company also announced it can now supply coiled stock as heavy as 16 gage.

New York—Following a mild flurry recently, sheet demand appears to have dropped back a bit. This is par-

Six Thimbles for Oregon Nickel Plant

These cinder pots, loaded upside down on a 52-ft flat car are ready for shipment from Mackintosh-Hemphill Co.'s Midland, Pa., plant to the new nickel plant of Hanna Nickel Smelting Co. at Riddle, Oreg. At Hanna, the 50-cu-ft capacity cast steel pots will be used to carry slag from electric smelting furnaces. The loops are tilting lugs and are made of cold-rolled steel bars cast integral with the rest of the pot. Lifting trunnions also are integral parts of the castings

Tool kit to service 29 truck batteries

Today's high speed production places more and more responsibility on the constant availability of industrial trucks—and on the batteries which give them motive power.

Here again, EDISON batteries offer additional economies to industrial truck users. Their maintenance is so simple that the tools above are all that are normally required by one typical user who operates twenty-nine truck batteries.

Besides EDISON's features for easy battery operation and maintenance, don't forget that EDISON batteries also provide *more than twice the service life* of ordinary batteries, as well.

To get acquainted with all of EDISON'S cost-cutting features in industrial truck operation, why not request a visit from the EDISON field engineer nearest you. For complete information and copies of Bulletins 2039 and 3808, simply write Edison Storage Battery Division, Thomas A. Edison, Inc., West Orange, N. J.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

ticularly true in the major tonnage items—hot and cold-rolled sheets. Trading in galvanized sheets is fairly active, with deliveries a bit on the tight side, a situation that has prevailed ever since the placing of grain bin storage tonnage by the government a few weeks ago.

Philadelphia—Sheet demand is on the buoyant side, though leaving much room for improvement. June bookings are running slightly ahead of May, but whether this rate will be maintained throughout the month remains a question, especially with consumer operations likely to taper in July because of vacations. Navy supply depot here will close bids June 25 on 865 tons of galvanized sheets for various Navy yards.

Pittsburgh—Little change has taken place in ordering sheet steel the past month. Automakers' requirements are moderate and may improve in third quarter. Increased sheet ordering depends on auto builders' plans for an early start on 1955 models. Demand from other quarters ranges from poor to fair.

Cincinnati — Prices of secondary sheets have stiffened. Sheet output has increased.

Steel Bars . . .

Bar Prices, Page 188

Philadelphia—Some hot carbon bar producers report a slight betterment in inquiry. Others see no improvement, and all agree that business at best is only fair. Railroads are buying little, requirements of agricultural equipment builders are down seasonally, inquiry from tool makers is limited, and replacements are coming through from jobbers rather slowly. However, consumer inventories have reached the point where replacements generally are providing greater support and cold drawers are calling for hot stock to meet modestly expanding demand. Navy supply depot here will close bids June 29 on 210 tons of reforging alloy bars and July 1 on 285 tons of carbon steel bars. Bids on 235 tons of carbon bars were closed by this depot last week.

New York—Whatever protective covering there may have been as insurance against a steel strike has completely subsided. Labor negotiations, scheduled to be concluded by end of this month, might be extended beyond, but this is highly doubtful. Also considered doubtful is that there will be a strike.

Business, meanwhile, is spotty, with sales volume so far this month possibly a shade better than in the corresponding period of May.

Pittsburgh — Sales are gaining

"6,000 employees . . ."

A. W. STEUDEL
President
Sherwin-Williams Company

"Naturally, we of Sherwin-Williams give complete endorsement to the Payroll Savings Plan. But we feel that mere approval of a national thrift movement that contributes so much to the personal security of our employees and the economic stability of our country is not enough. In our continuing effort to build employee participation in our Plan, we utilize the personal contacts and enthusiasm of our enrolled Payroll Savers. A recent person-to-person canvass by our employees put a Payroll Savings application blank in the hands of every man and woman in our plants and offices. The result, nearly 6,000 serious savers were added to our Payroll Savings Plan."

The personal interest of executives like Mr. Steudel, and the systematic bond purchases of more than 8,000,000 enrolled Payroll Savers are reflected in the following figures:

- In March, 1954, purchases of U.S. Savings Bonds, Series E and H, by *individuals* reached $474 million, highest March figure in 9 years—a gain of 20% over March, 1953.
- Purchases of E and H Bonds, by *individuals* during the first quarter of 1954, totaled $1,380 million—the highest for any quarter since 1945.
- The *cash value* of Series E and H Bonds held by *individuals* at the end of March, 1954, was $37 billion, 175 million—the highest in the thirteen year history of the Savings Bond program.
- Payroll Savers are serious savers: over 75% of the amount of Series E Bonds that matured since May, 1951—almost $9 billion—is still being held by individuals under the Treasury's 10 year optional automatic extension plan.
- For the third straight month of 1954, sales of E and H Bonds exceeded maturities and redemptions. The sales excess amounted to $242 million on March 31—the highest first quarter net since 1950.

If employee participation in your Payroll Savings Plan is less than 50%—or if your company does not have a Payroll Savings Plan, get in touch with Savings Bonds Division, U.S. Treasury Department, Washington, D.C. Your State Director, U.S. Treasury Department, will be glad to help you install a Plan and build employee participation.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

ARCOS FOR FINEST QUALITY WELDS

Submerged Arc Welding of Stainless with **new** Arcosite Flux

Now, for the first time, you can apply the economy of submerged arc welding to stainless steels. No longer need you worry about cracking, or poor transfer of the essential stainless elements. The combination of *new* ARCOSITE FLUX and *new* ARCOS CHROMAR (Stainless Steel) WIRE provides a balanced analysis for sound, dependable welds on every job. It's another example of how Arcos experience with coated electrodes and weld metallurgy is being translated into tangible benefits for you.

Write today for the Arcosite Flux Bulletin and see how you may profit from these two *new* Arcos products. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pennsylvania.

WELD WITH ARCOS

STAINLESS WIRE AND ARCOSITE FLUX

slightly from earlier second quarter levels, but the net result is an improvement of not more than 5 per cent from April sales. Scattered gains are credited to increasing orders from small fabricators rather than leading customers.

Cleveland—Except for some slight gains in demand for cold-finished, the merchant bar market is running along about in the same groove as it has since opening of the quarter. Mills do not anticipate much change in the market over the summer. In fact, some look for a falling off in requirements because of plant shutdowns for mass vacation.

Cincinnati—Alloy bars are running into a quiet period. Carbon bar business has now started to pick up. Stocks are plentiful.

Los Angeles—Producers were unable to fill June order books on merchant bars. Reduced requirements of aircraft parts fabricators are contributing to the lessening demand.

Seattle—Rolling started early this month at the works of the Pacific Steel Rolling Mills Inc. Small merchant bars and small shapes are being rolled exclusively.

Facilities include a continuous rolling mill of 6 stands, 2 high, oil heating furnaces and automatic cooling bed. The latter requires no manual attendance, bars being delivered from the cooling bed to the shear man automatically. Capacity of present equipment is 400 tons per month.

Future expansion plans of the company include an 8-in., 6-stand continuous mill, a 2-high breakdown mill and a small electric melt furnace.

Wire . . .

Wire Prices, Page 190

Boston—Not before fall is demand for finished wire expected to rebound to normal level. Although consumer inventories are down, some apparently dangerously low, most users will go through August limiting orders to fill-in requirements to meet curtailed consumption.

New York—Consumer wire inventories are down and volume placed with mills is slightly heavier than last month on more products, notably for those needed for industrial assembly. Mild bulge in basic wire is accompanied by a trifle increase in music and spring wire demand, but most high carbon wire specialties are slow.

Miscellaneous buying for construction and highway work is maintained, notably guard rail cable. Rope wire lags with distributor stocks of rope still substantial.

Pittsburgh—The spring rush of or-

rs for merchant trade products ch as lawn fence, welded fence fab- and nails has leveled out.

San Francisco—Wire products have orked back to a point where sales re accounting for a good part of cal producers' total volume.

emifinished Steel . . .

Semifinished Prices, Page 188

Chicago—For the last six weeks his district has outproduced the na- on in steelmaking by 12.5 points. In anuary, the margin was only 6.5 oints. For 24 weeks this year, the hicago district ingot rate has domi- ated by an average of almost 10 oints. Noteworthy, however, is the videning of the gap in May and une. Currently orders for finished teel for July are coming in at a bet- er rate.

April Steel Shipments Off

New York—Direct shipments of inished steel in April totaled 5,287,- 72 net tons, reports the American ron & Steel Institute. This compares with 5,583,690 tons in March and with 7,162,460 tons in April last year.

Construction and contractors' prod- ucts received 20.1 per cent of the total, or about 1,017,700 tons. That percentage compared with 20.0 per cent in March, 19.2 in February, 18.7 in January and 17.1 in all of 1953.

Warehouses received 990,170 tons, or 19.6 per cent of total domestic shipments, comparing with 18.5 per cent in March.

Shipments to the automotive in- dustry amounted to 910,677 tons dur- ing the month, 18 per cent of total tonnage moved. This compares with 17.6 per cent in March.

Tool Steel . . .

Tool Steel Prices, Page 192

New York—Shipments of high speed and tool steel (excluding hol- low drill steel) declined in April as compared with shipments in March and April a year ago, reports the American Iron & Steel Institute. To- tal shipments during the month were 7297 tons, of which 1010 tons were Class A high speed steel, 196 tons, Class B, and 6156 tons other tool steels.

March shipments were 8454 tons of which 1168 were Class A, 300 Class B, and 7106 tons other tool steels. In April a year ago shipments totaled 11,525 tons, of which 2211 were Class A, 252 Class B, and 9062 tons other tool steels.

Shipments through April this year totaled 31,299 tons.

ARCOS FOR FINEST QUALITY WELDS

Mountains crumble as **welded** jaws bite in

Modern power shovels gulp truckloads of rock and dirt at one bite. It's a good example of how *welded* high tensile steels make possible bigger payloads—provide extra strength and toughness to reduce maintenance.

An important factor in this achievement is the quality of weld metal. That's why so many fabricators today specify Arcos Low Hydrogen Electrodes when welding low alloy high tensile steels. *On any job* demanding shock and abrasion resistance . . . maximum strength and ductility, the excellent properties of Arcos weld metal assures the results you want in service. Arcos offers quality weld metal and technical assistance that is second to none. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

WELD WITH ARCOS LOW HYDROGEN ELECTRODES

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85% C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2%max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton. 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, and 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6 per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

ructural Shapes . . .

Structural Shape Prices, Page 188

Chicago—Construction continues at active clip in this area and as consequence demand for structural shapes has slipped off less than for some other products. The picture is clustered by the fact that some very large jobs are being fabricated currently.

Fabrication of steel for the first two main caissons for the Mackinac Straits bridge is under way at the Gary, Ind., plant of the American Bridge Division, U. S. Steel Corp. The first shipment of 16 cutting edge sections was announced last week. An estimated 5200 tons of structural steel will go into the two caissons. American Bridge has the $44,500,000 contract to erect the superstructure for the 5-mile-long bridge.

New York—Relatively, this district appears to be lagging behind the country as a whole in point of structural demand. Some contractors and fabricators, with offices scattered throughout the United States, report inquiry, in its tentative and active stages, as being the highest ever. A terrific amount of demand is shaping up for bridges and road work, aircraft hangars, schools and commercial buildings of one description or another. There is less industrial work than in recent years, but still a considerable amount. Meanwhile, contracting continues at a fairly high level. Also, there is considerable activity in public housing, governmental buildings and churches.

Locally, a substantial tonnage is being figured, but not on the scale that might be expected considering the density of the population and its usual relation to volume in other parts of the country.

New Jersey Turnpike Authority, New Brunswick, N. J., will close bids July 8 on 19,500 tons for a bridge superstructure over the Delaware river near Florence, N. J., and Edgely, Pa.

Boston—While equalizing on bar shapes, producers of standard structurals and wide flange sections are reluctant to meet the $7 per ton reduction by the Phoenixville, Pa., mill. To do so would mean freight absorption of $7 to $12, depending on producing point. With foreign standard shapes slightly higher, the delivered price from Phoenixville, 4.44c Boston, is competitive with imported steel.

District fabricating shops, with backlogs usually better than three months, are well covered on plain material.

Philadelphia—Aside from a reduction in low phos structurals and plate to $27 delivered consumer plant, scrap prices are unchanged. Trading in all grades is slack and most sellers anticipate little improvement in the near future. Inventories at district mills are substantial, and especially considering the limited rate of operations.

Philadelphia — Though structural contracting continues rather light in this district, there is a good scattering of inquiry and fabricators generally are encouraged over the outlook.

Birmingham — Ingalls Iron Works Co. is fabricating 1300 tons of structural steel for a sugar refinery for Alberto F. Vollmer, near Caracas, Venezuela.

Los Angeles—For the first time this year, the downward trend of structural sales slowed, but producers are still pessimistic.

Seattle—Fabricators are busy but smaller plants need new orders to maintain current levels.

Steel Output Rises in May

New York—Production of ingots and steel for castings increased in May, reports the American Iron & Steel Institute. Output for the month was 7,467,000 net tons, comparing with 6,970,937 tons in April. In May, 1953, however, production totaled 9,997,080 net tons.

The May output this year was 5.0 per cent higher than the average for the 1947-1949 period. This is indicated by the index of production, which was 105.0 in the month. The index is based on the average output of the 1947-49 period.

In the first five months of this year production totaled 36,762,260 net tons, the index for the period being reported at 106.1. A year's output at the rate of the first five months of 1954 would be equivalent to more than 88 million tons.

Output in May was 70.7 per cent of capacity as rated at the start of this year. For the first five months of 1954 the rate was 71.4 per cent. Annual steelmaking capacity at the start of this year was more than 124.3 million net tons.

Period	——OPEN HEARTH—— Net tons	Per cent of capacity	‡Index	——BESSEMER—— Net tons	Per cent of capacity	‡Index	——ELECTRIC—— Net tons	Per cent of capacity	‡Index	——TOTAL—— Net tons	Per cent of capacity	‡Index	Calculated weekly production (Net tons)	Number of weeks in month
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Qtr.	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
*April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
†May	6,818,000	73.6	106.4	198,000	48.7	56.4	451,000	50.8	126.3	7,467,000	70.7	105.0	1,686,000	4.43
1953														
January	8,841,679	101.4	138.0	350,200	88.9	99.7	706,083	81.2	197.7	9,897,962	99.1	139.1	2,234,303	4.43
February	7,939,299	100.8	137.2	329,389	92.6	103.8	664,091	84.6	205.9	8,932,779	99.1	139.0	2,233,195	4.00
March	9,050,773	103.7	141.3	354,710	90.0	101.0	762,615	87.7	213.5	10,168,098	101.8	142.9	2,295,282	4.43
1st Qtr.	25,831,751	102.0	138.9	1,034,299	90.4	101.4	2,132,789	84.5	205.7	28,998,839	100.0	140.4	2,254,964	12.86
April	8,493,909	100.5	137.0	334,605	87.7	98.4	717,024	85.2	207.4	9,545,538	98.7	138.7	2,225,067	4.29
May	8,925,163	102.3	139.3	354,577	90.0	100.9	717,340	82.5	200.8	9,997,080	100.1	140.5	2,256,677	4.43
June	8,394,502	99.4	135.4	332,080	87.0	97.7	677,917	80.5	196.1	9,404,479	97.2	136.6	2,192,186	4.29
2nd Qtr.	25,813,574	100.8	137.3	1,021,242	88.3	99.0	2,112,281	82.7	201.5	28,947,097	98.7	138.6	2,224,988	13.01
1st 6 mos.	51,645,325	101.4	138.1	2,055,541	89.3	100.2	4,245,070	83.6	203.6	57,945,936	99.4	139.5	2,239,889	25.87
July	8,316,342	95.5	129.8	324,068	82.4	92.2	635,263	73.2	177.9	9,275,673	93.1	130.4	2,098,569	4.42
August	8,463,155	97.0	132.1	310,074	78.7	88.2	632,351	72.7	177.0	9,405,580	94.2	132.2	2,123,156	4.43
September	8,076,277	95.8	130.3	287,638	75.6	84.6	519,513	61.9	150.3	8,883,428	92.1	129.0	2,075,567	4.28
3rd Qtr.	24,855,774	96.1	130.8	921,780	78.9	88.4	1,787,127	69.4	168.6	27,564,681	93.1	130.6	2,099,366	13.13
9 mos.	76,501,099	99.6	135.6	2,977,321	85.8	96.2	6,032,197	78.8	191.8	85,510,617	97.3	136.5	2,192,580	39.00
October	8,648,428	99.1	135.0	325,250	82.6	92.6	489,044	56.3	136.9	9,462,722	94.7	133.0	2,136,055	4.43
November	8,002,349	94.7	129.1	283,321	74.3	83.3	404,382	48.0	117.0	8,690,052	89.9	126.2	2,025,653	4.29
December	7,321,947	84.1	114.3	269,813	68.6	76.8	354,568	40.9	99.3	7,946,328	79.7	111.7	1,797,812	4.42
4th Qtr.	23,972,724	92.6	126.1	878,384	75.2	84.2	1,247,994	48.4	117.7	26,099,102	88.1	123.6	1,986,233	13.14
2nd 6 mos.	48,828,498	94.4	128.4	1,800,164	77.1	86.3	3,035,121	58.9	143.2	53,663,783	90.6	127.1	2,042,778	26.27
Total	100,473,823	97.9	132.2	3,855,705	83.2	93.2	7,280,191	71.1	173.1	111,609,719	94.9	132.2	2,140,578	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954 as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1953 of 1,969,275 net tons open hearth, 88,934 net tons bessemer and 196,250 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953 as follows: Open hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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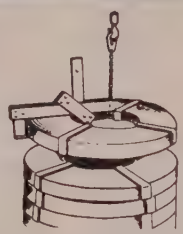

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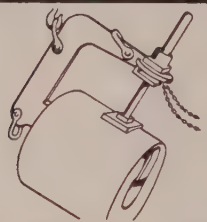

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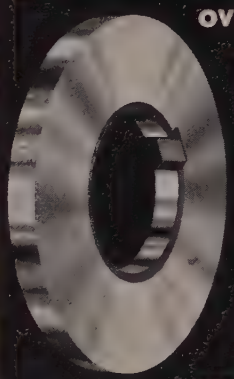

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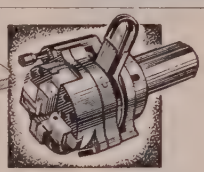

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'n Plate . . .

Tin Plate Prices, Page 190

Pittsburgh — Canmakers have ac-red large tin plate stocks for this ar's canning season and their or-'s are now received at a slower ce than last month. June orders re higher than normal due to some ventory building against a possible eel strike.

San Francisco—Canmaking firms ve been pushing their expansion ans in California to meet the de-ands for beer containers, expected be 70 per cent greater this year.

ron Ore . . .

Iron Ore Prices, Page 203

Cleveland—Iron ore is beginning move from the head of the lakes a somewhat faster pace. Ship-ents in the week ended June 14, to-ling 2,640,193 gross tons, were the rgest for any week since opening the 1954 navigation season, top-ng the preceding week's tonnage 404,183 tons. However, the move-ent was 574,497 tons under that in e like week of 1953.

Cumulative shipments of lake ore the shipping season to June 14 re 16,180,396 gross tons. This com-ares with 28,436,475 tons on the ke date of the 1953 season.

TRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

35 tons, factory building, General Electric Realty Co., Roanoke, Va., to American Bridge Division, U. S. Steel Corp., Pitts-burgh.

30 tons, Queens Midtown expressway No. 4, New York, through Horn Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, including reinforcing steel, ware-houses, Marine Corps supply depot, Albany, Ga., to Joseph H. Fox Co., Birmingham, Ala.; Thompson & Street Co., Charlotte, N. C., general contractor.

50 tons, high school, South Orange, N. J., to Schacht Steel Construction Inc.

00 tons, two Army warehouses, Elmendorf Air Base, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; L. E. Baldwin Inc., Seattle, general contractor, low $2,403,-338.

30 tons, hospital addition, Abbington, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

20 tons, high school, Warwick, R. I., to Tower Iron Works, Providence, R. I.; E. Turgeon Construction Co., Inc., Providence, general contractor.

50 tons, plate girder bridge, Waterbury, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; Mariani Construction Co., New Haven, general contractor.

05 tons, hangar No. 11, Idlewild Airport, Queens, New York, through Ranes Construc-tion Co., general contractor, to Grand Iron Works, Bronx, that city.

00 tons or more, power plant, Old Hickory dam, Columbia river, Tennessee, to Nash-ville Bridge Co., Nashville; Farnsworth & Chambers, Inc., Houston, Tex., general contractor; Laclede Steel Co., St. Louis, re-inforcing steel.

60 tons, 19-story apartment, Park Ave. and 36th St., New York, to Bethlehem Steel Co., Bethlehem, Pa.

365 tons, Coughlin High School, Wilkes-Barre, Pa., to Anthracite Bridge Co., Scranton, Pa.

150 tons, government cranes, unspecified proj-ect, to Pacific Car & Foundry Co., Seattle.

145 tons, Frankfort Creek bridge, Philadelphia,

ORES—COKE—REFRACTORIES

Prices as reported to STEEL; changes shown in *italics*.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$23.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$21.00-$22.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill, $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

to American Bridge Division, U. S. Steel Corp.

145 tons, state highway bridge, Portsmouth-Newington, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Landers & Griffin Co., Portsmouth, general contractor.

100 tons or more, including miscellaneous iron, hangar and building addition, Lincoln Naval Air Base, Great Lakes, Ill., to Omaha Steel Works, Omaha, Nebr.; C. H. Leavell & Co., El Paso, Tex., general contractor.

100 tons, junior high school, Attleboro, Mass., to West End Iron Works, Cambridge, Mass.; Vara Construction Co., Boston, general contractor; reinforcing bars to Northern Steel, Inc., Boston

100 tons, high school, Litchfield, Conn., to Topper & Griggs, Hartford; Bonvicini Building Co., Inc., Torrington, Conn., general contractor.

100 tons, including reinforcing steel, truss bridge, Lee, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Mackin Sand & Concrete Products Co., Greenfield, Mass., general contractor; Northern Steel, Inc., reinforcing steel.

STRUCTURAL STEEL PENDING

19,500 tons, Delaware river bridge, bids to be closed July 8 by the New Jersey Turnpike Authority, New Brunswick, N. J.; tonnage comprises 8500 tons of carbon steel and 11,000 tons of silicon steel; also required are 95 tons of steel castings. Bridge will be located near Florence, N. J., and Edgely, Pa. and will link the New Jersey and Pennsylvania turnpikes. Pennsylvania authority and the New Jersey authority recently placed a $3,688,223 contract for the substructure to the Merritt-Chapman & Scott Corp., New York.

2600 tons, state bridge, Vine street, Philadelphia, bids July 9.

1000 tons or more, superstructure, contract 3, bridge, Mississippi river, Clinton, Ia., Allied Structural Steel Companies, Clinton, low.

760 tons, state bridge, Cumberland county, Pa., Hemp Bros., Camp Hill, Pa., low on general contract.

700 tons, transit shed, naval station, Newport, R. I.; Gilbane Building Co., Providence, R. I., low general contract.

690 tons, state turnpike, section 35-1, Lehigh county, Pa., bids July 1.

450 tons, relocation Union Pacific railway bridge, Des Chutes river, Oregon, The Dalles power project; Lee Hoffman, Beaverton, Oreg., low $519,191 to U. S. Engineer, Portland, Oreg.; 70 tons of reinforcing also involved.

395 tons, hangar, Air Force base, Bedford, Mass.

150 tons, security warehouse, bids to be closed by the Commonwealth of Pennsylvania, Harrisburg, June 30.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2000 tons, four public schools, Philadelphia, through McClosky & Co., that city, general contractors, to Bethlehem Steel Co., Bethlehem, Pa.

830 tons, deep sea terminal facilities, Whittier, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Patti-MacDonald Co., San Francisco, general contractor.

500 tons, high school, Lansdale, Pa., to American Steel Engineering Co., Philadelphia, through Wark Co., that city.

500 tons, hangar and building addition, Lincoln Naval Air Base, Great Lakes, Ill., to Ceco Steel Products Corp., Omaha, Nebr.; C. H. Leavell & Co., El Paso, Tex., general contractor.

215 tons, high school, Warwick, R. I., to Plantations Steel Co., Providence, R. I.; E. Turgeon Construction Co., Providence, general contractor.

140 tons, unstated Army project and preflight facilities, Boeing Airplane Co., to Bethlehem Pacific Coast Steel Corp., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

3000 tons, municipal flotation plant, Philadelphia, McCloskey & Co., that city, awarded general contract.

775 tons, bridge piers, contract 218, Maine turnpike extension, Portland-Augusta; Gil Wyner & Co., Malden, Mass., low, general contract; also erection of 13 bridges, 2180 tons, delivered Portland, Me., bolting.

650 tons, gateway cause, Weber Basin project, Utah; bids in to Bureau of Reclamation, Denver, June 15.

645 tons, two grade separation underpasses, Soldiers' Field road, Brighton district, Boston, Metropolitan District Commission; Colmen Bros. Corp., Boston, low, $1,672,198.50.

335 tons, Navy supplies depot, Philadelphia, bids June 28.

150 tons, addition to Washington Athletic Club, Seattle; general contract to H.S. Wright Construction Co., Seattle.

50 tons, also unstated miscellaneous, Rogue river, Oregon; bids to Bureau of Roads, Portland, Oreg., June 17.

PLATES . . .

PLATES PLACED

250 tons, four tanks, Oyster Bay, Long Island, N. Y., through Otto Sanbach, to Hammond Iron Works, Warren, Pa.

PLATES PENDING

500 tons plus, fuel oil storage tanks, Mountain Home, Idaho, air base; bids in to U. S. Engineer, June 16.

450 tons, 1-million gal steel reservoir, Hopkins, Minn.; bids July 6, city manager.

100 tons, million-gal water reservoir; Chicago Bridge & Iron Co., Seattle, low $32,695 to Salem Heights District, Salem, Oreg.

100 tons plus, also shapes, 150-ft lighthouse tender for North Pacific service; bids to F. T. Collins, secretary, Department of Transport, Ottawa, Can., July 5; British Columbia yards bidding on $1¼ million craft.

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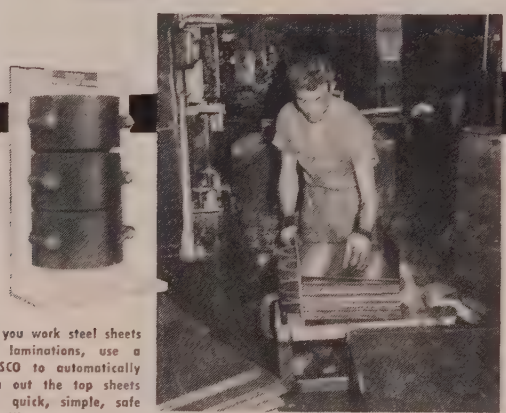

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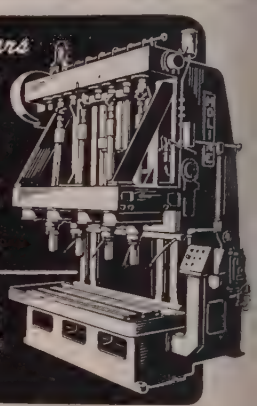

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ubular Goods . . .

Tubular Goods Prices, Page 191

Pittsburgh—Slow improvements in amless and buttweld sales result in pemakers acquiring a modest back- of orders in some cases. Buttweld ins are particularly encouraging. ins are due to inventory depletion d not "hedge buying", producers y.

While specialty tubing sales re- ain slow, there is a gain in sales of echanical tubing.

Seattle—Alaska U. S. Engineer re- rts steady progress on construc- on of the Haines-Fairbanks govern- ent petroleum pipeline. Already 115 iles of the 615-mile line have been id and welded.

Seattle—Cast iron pipe demand is asonally normal but no awards ere released last week. Tacoma as given preliminary approval to a oposed 5½ mile cast iron project timated at $150,000, bids expected on.

lates . . .

Plate Prices, Page 188

New York—Business in plates is eady, but volume is far from active. earby shipments are readily obtain- ole, and most producers see little ick up in the near future.

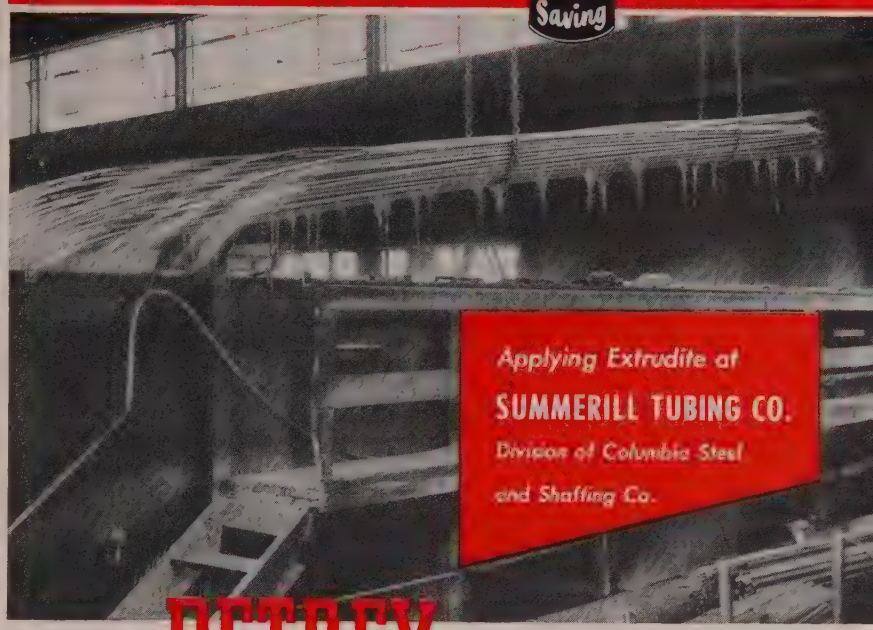
Bath Iron Works, Bath, Me., has ntract for three destroyers, approx- nately $15.5 million each. Six de- royers are now under contract to rivate district yards. Bethlehem uincy, has three on which work ill start this summer. Quincy yard ill also do design work for two 0,000-ton new type ammunition hips to be built at Sparrows Point, Md.

Philadelphia—Plate buying still ags. Most district producers can ac- ept orders for quick shipment, and nticipate no general pick-up over he next several weeks. Railroad re- uirements remain very light, and in- uiry here for ship work is confined nostly to miscellaneous lots for the Navy, with specifications issued by he local supply depot for various ards throughout the country. Larg- st lot now pending involves 1721 ons of carbon plates, bids June 23.

Pittsburgh—High level of construc- ion activity continues to keep sales steady, although other consuming groups such as barge builders report declining steel requirements. With fewer large pipe lines being built, an- other source of plate consumption is dwindling.

Seattle—Plate fabricators report inquiry slow, confined mostly to small tonnages for tanks and reservoirs in this area.

ANOTHER CASE OF DETREX Service WITH A Saving AT WORK



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gives a smoother, better draw . . . with fewer rejects

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Summerill's production standards are so high that only the best passes inspection. With Extrudite, Summerill found production on the up-swing—rejections greatly lowered. Quality control of tube I.D.'s and surfaces also levelled out—became easier to maintain. With Detrex Extrudite, another dividend was realized . . . rust on tube I.D.'s is virtually eliminated.

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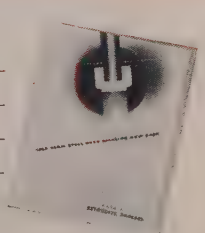
Please send us your free descriptive bulletin on the Extrudite Process.

NAME_____TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ZONE_____STATE_____



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

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crap Reflects Summer Slackening

Sluggish buying by mills and foundries as vacation season approaches brings halt to uptrend in prices. Decline is expected in market over coming weeks

Scrap Prices, Page 208

Chicago—In purchases by a leading mill important steelmaking grades of scrap have lost $1 of their recent upswing in price. For example, No. 1 heavy melting sold for $32, No. 2 heavy melting for $28, No. 1 factory bundles for $33, No. 1 railroad heavy melting for $34 and machine shop turnings for $14 a gross ton. The weakening isn't regarded as serious.

Washington—Consumption of iron and steel scrap during April decreased slightly from March, though the daily consumption rate increased per cent, reports the Bureau of Mines. Pig iron consumption also decreased during the month, falling off 8 per cent from March, with the daily consumption rate down 5 per cent.

Total melt, 8,666,000 gross tons, consisted of 53.4 per cent scrap and 6.6 per cent pig iron during April, comparing with 51.5 per cent and 8.5 per cent, respectively in March.

Scrap for consumption in April was 4,417,000 gross tons, 3 per cent less than in March. Home scrap accounted for 2,671,000 tons, and purchased scrap, 1,746,000. Of the purchased scrap, 81 per cent was received from dealers and 19 per cent from other sources.

Stocks of ferrous scrap held by consumers amounted to 5,915,000 gross tons, decreasing for the fourth consecutive month.

Buffalo—Steelmaking grades of scrap are firm at current price levels. Cast prices, however, have broken $1 to $2 a ton on new business. Dealers are ignoring mill bids for additional orders on ingot grades at present prices despite large yard stocks.

Pittsburgh—Relighting of a blast furnace in this area further reduces scrap requirements of local mills. Purchasers are resisting any change from present prices. Result is that small volume trading continues at prevailing rates.

Cleveland—Mill and foundry buying of scrap is at a virtual standstill in this market. For the present prices are holding unchanged but expectations are a decline of as much as $2 per ton will be experienced over the next few weeks. This is based on the assumption avoidance of labor trouble in the steel industry will result in a stepping up in blast furnace operations with attending curtailment in use of scrap in steelmaking. Also, vacation suspensions and curtailments at steelworks and foundries will hold down demand for scrap over the next month or so.

Cincinnati—An increase of 50 cents a ton in mixed borings and turnings, short shoveling turnings and cast iron borings is the only price activity in the Cincinnati market. This change amounts to an adjustment and does not represent a significant trend.

Detroit—Steelmaking scrap prices are unchanged. However, observers anticipate some declines shortly. Volume is tending to taper off. Hedging against a steel strike can only mean reduced operations whether through a strike or reduction of inventories.

Cast grades took a slight drop as foundry operations slowed down.

St. Louis—Scrap demand is easing

(*Please turn to page* 210)

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
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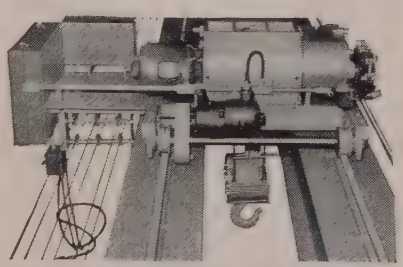
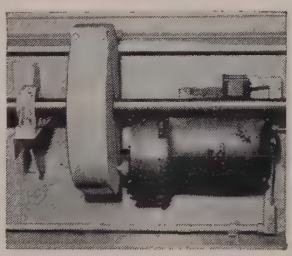
Investigate the Economy of a EUCLID *Utility* CRANE



For intermediate demands in material handling, Euclid Utility Cranes meet all requirements.



Here for example, is a 54 ft. span double-girder crane in which the hoist is a standard Euclid unit of long proven merit. Geared head motors of widely accepted high quality are used to propel the bridge and the hoist trolley. Control is by push-buttons from the floor.

This construction provides a crane with a full safety factor of five that measures up to all demands in capacity, performance and serviceability; and also effects economies in first cost, in operation and maintenance.

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 16	$27.83
June 9	28.17
May Avg.	28.00
June, 1953	40.50
June, 1949	20.85

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	29.00-30.00
No. 2 bundles	24.00-25.00
No. 1 busheling	29.00-30.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals	30.00-31.00
Heavy turnings	28.00-29.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	33.00-34.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	28.00-29.00
No. 2 bundles	21.00-22.00
No. 1 busheling	28.00-29.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	26.00-27.00
Cut structural plate 2 ft and under	34.00-35.00
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	26.00-27.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	27.50-28.50
Stove plate	36.50-37.50
Heavy breakable cast	26.50-27.50
Unstripped motor blocks	25.50-26.50
Brake shoes	30.50-31.50
Clean auto cast	43.00-44.00
No. 1 wheels	33.50-34.50
Burnt cast	31.50-32.50
Drop broken machinery	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft. and under	44.00-45.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	42.50-43.50
Rails, rerolling	42.00-43.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	22.00-23.00
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	30.00-31.00
Electric furnace bundles	29.00-30.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	21.00
No. 1 bundles	24.00
No. 2 bundles	nom.
No. 1 busheling	23.00
Electric furnace bundles	25.00*
Machine shop turnings	14.00
Mixed borings, turnings	15.00
Short shovel turnings	17.00
Structurals & plate	27.00*
Heavy turnings	22.00*
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	37.00-38.00*
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	17.00-18.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	17.00-18.00
No. 2 bundles	12.00-13.00
Machine shop turnings	4.50-5.00
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	21.00-22.00
Short shovel turnings	10.50-11.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.00
No. 2 heavy melting	15.25-16.00
No. 1 bundles	17.00
No. 2 bundles	13.25-14.25
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	10.00-10.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	22.00-23.00
No. 1 busheling	27.00-28.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	*14.00-15.00*
Cast iron borings	*14.00-15.00*
Low phos., 15-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R., heavy melt.	29.00-30.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

CHICAGO

No. 1 heavy melting	*30.00-32.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 factory bundles	*32.00-33.00*
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	*30.00-32.00*
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*13.00-14.00*
Short shovel turnings	*15.00-16.00*
Cast iron borings	*15.00-16.00*
Cut structurals, 3-ft	34.00-35.00
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	32.00-34.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	40.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R., heavy melt	*33.00-34.00*
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Angles, splice bars	38.00-39.00
Rails, rerolling	44.00-45.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	*40.00*
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00
No. 2 heavy melting	20.00
No. 1 bundles	25.00
No. 2 bundles	19.00
No. 1 busheling	23.50
Machine shop turnings	10.00
Mixed borings, turnings	10.00
Short shovel turnings	11.50
Punchings & plate scrap	25.50

Cast Iron Grades

No. 1 cupola	*24.00*
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	*25.00*
Unstripped motor blocks	18.00
Clean auto cast	40.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	26.00-27.00
No. 2 bundles	19.00-20.00
No. 1 busheling	26.00-27.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.50-18.00
Short shovel turnings	18.50-19.00
Cast iron borings	17.50-18.00
Low phos.	29.00-29.50

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*37.00-38.00*
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	*26.00-27.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural, plate 2 ft.	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	26.50
No. 2 heavy melting	24.50
No. 1 bundles	26.50
No. 2 bundles	25.50
Machine shop turnings	12.00
Short shovel turnings	14.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	27.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00
Rails, 18-in. and under	41.00
Rails, random lengths	38.00
Rails, rerolling	*44.00*
Uncut tires	42.00
Angles, splice bars	33.50

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	35.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	41.00-43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	35.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	18.00
No. 2 bundles	14.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

HAMILTON, ONT.

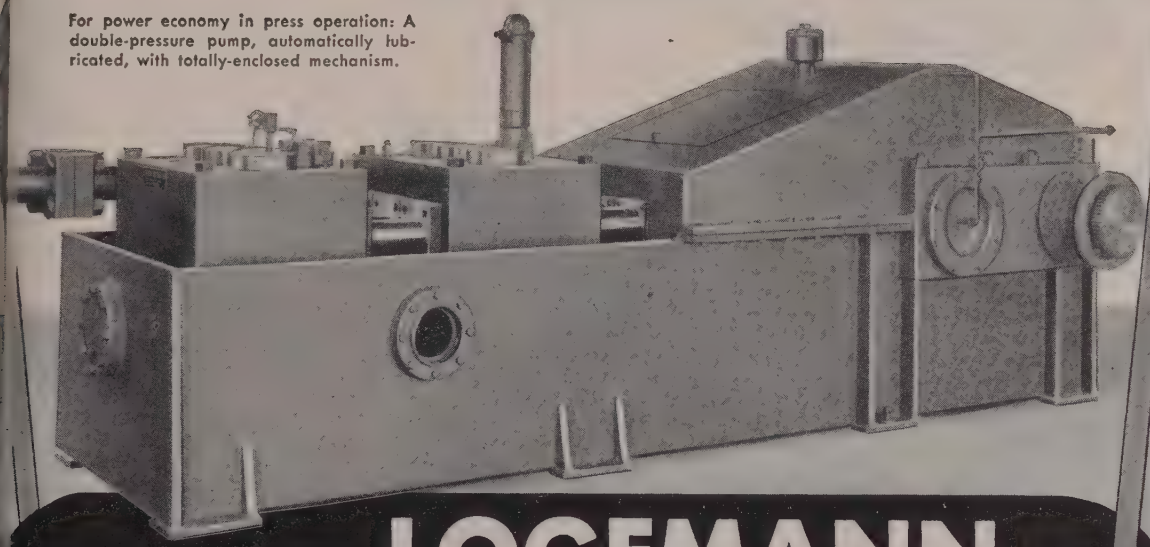
(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



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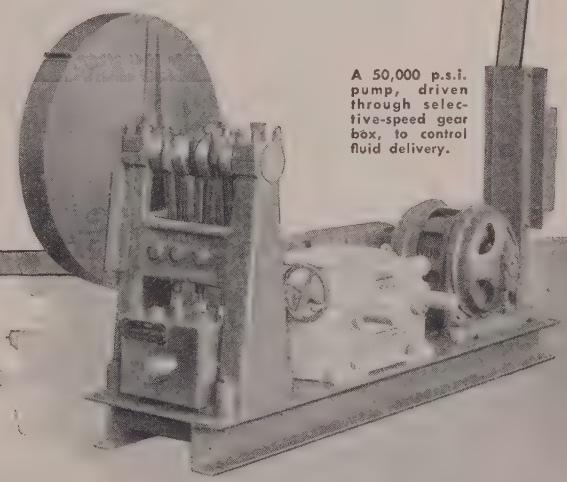

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(*Concluded from page* 207)

as mills buy cautiously. Result is softer prices, with many quotations nominal, especially on machine shop turnings and shovelings. Moderately good shipments enable brokers to fill outstanding orders without trouble.

Rail offerings are heavier as the roads step up equipment dismantling.

Birmingham — Even with moderate increases in demand over the past few days, the district's scrap market fails to show particular strength.

Los Angeles—Hopes that increased exports would pump new life into the sagging scrap market have been abandoned with failure of two Japanese steel mills.

San Francisco—Mill operations are picking up, one large producer being at 86 per cent this week. Demand for steel scrap lags, however.

Seattle—Scrap continues in the doldrums. Reduced mill production is reflected in lesser volume. Larger buyers are carrying smaller inventoriees.

Pig Iron . . .

Pig Iron Prices, Page 192

New York—Pig iron shipments are beginning to reflect the vacation season. Various foundries will be closing down next week for a period extending through July 4. Still more will be down the following week and in some cases longer for mass vacations. There will be still others that will be suspending for mass vacations at one time or another throughout the next two months.

Most pig iron sellers anticipate a buying lag until after Labor Day, at which time they say they can reasonably expect a return to recent operating levels.

Buffalo—Demand for merchant pig iron continues to lag here. Automotive and accessories sources, along with building equipment casters, are active buyers. But diversified jobbers are limiting purchases.

Philadelphia — Movement of pig iron is tapering rapidly, because mass vacations are scheduled to begin at a number of foundries next week and still more scheduled for the following week. Most pig iron sellers look for a dull summer.

Chicago—From now to Labor Day demand for pig iron will suffer, principally because foundries will be scheduling vacations of varying lengths during this period. Roughly about one-fifth of over-all working time will be suspended.

Pittsburgh—Pig iron production in

Pittsburgh-Youngstown district o 1,575,000 tons in April, 1954. is the lowest production in one h since July, 1952. Some 27 per less pig iron was produced in area in the first four months of than in the like 1953 period.

veland — Sluggish demand for hant iron reflects continued y operations in the foundry in- ry. The casting shops are or- g only what they need, holding tories down to a minimum in instances.

reign Ores . . .

Foreign Ore Prices, Page 203

ew York—Demand for foreign nganese and chrome ores is quiet, domestic consumers well sup- . Prices on these ores, however, steady, except for a drop in h African Transvaal chrome, 44 cent, no ratio, which grade is holding at $21 to $22 per gross f.o.b. cars, eastern seaboard. consumer stocks in this country le, importers in general appar- y do not see much point in drop- their prices in an effort to de- p business. Moreover, costs of ign producers are sufficiently to discourage much price cut- in many cases.

eanwhile, foreign wolframite, h has been subject to more than nal fluctuation over recent weeks. wer on some business at $23, per ton before duty, for good com- cial quality.

inforcing Bars . . .

Reinforcing Bar Prices, Page 188

Washington—Guided missile launch- batteries, which are being built protect key bombing-target areas oss the nation, require large ton- es of steel. The batteries are built two sites, one for launching and for control. Each battery takes ut 85 tons of reinforcing bars about 15 tons or more of miscel- eous products. Three tanks, one storage of acid, also are required, largest having a 5000-gallon ca- ity.

Most of the $87.7 million carried in military construction bill for se- t projects will be spent on air ense for target cities. The bill also ried $60 million for construction air defense command bases, from ich fighter interceptor planes uld take off in event of an enemy ack.

Chicago — Outlook for reinforcing el is anything but dull in this area. uring to keep activity fairly ong for some time are many small s and a few unusually large ones.

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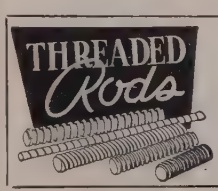

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...if only for THEIR sakes

...learn how to protect yourself from death from cancer. They need *you!*

And for your sake and theirs you must keep on remembering that the best cancer "insurance" is:

FIRST...*to make a habit of periodic health check-ups no matter how well you may feel, always including a thorough examination of the skin, mouth, lungs and rectum and (for women) the breasts and generative tract.*

SECOND...*to learn the seven danger signals that may mean cancer, and go straight to the doctor at the first sign of any one of them—(1) Any sore that does not heal (2) A lump or thickening, in the breast or elsewhere (3) Unusual bleeding or discharge (4) Any change in a wart or mole (5) Persistent indigestion or difficulty in swallowing (6) Persistent hoarseness or cough (7) Any change in normal bowel habits.*

For other life saving facts about cancer, phone the American Cancer Society office nearest you, or address your letter to "Cancer"—in care of your local Post Office.

American Cancer Society

SOLAR'S

SURE-SPEC STEELS

steel for any part
you make for any product
anytime at minimum cost!

Solar is proud to supply some of the steel for this New Super Deluxe Refrigerator by Deepfreeze. It's made by Deepfreeze Appliance Div., Motor Products Corporation.

"for service dependable as the sun"

SOLAR STEEL CORPORATION

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SALES OFFICES: Bridgeport • Chicago • Cincinnati • Cleveland • Detroit • Grand Rapids
Kalamazoo • Los Angeles • Milwaukee • Montreal • Nashville • Philadelphia
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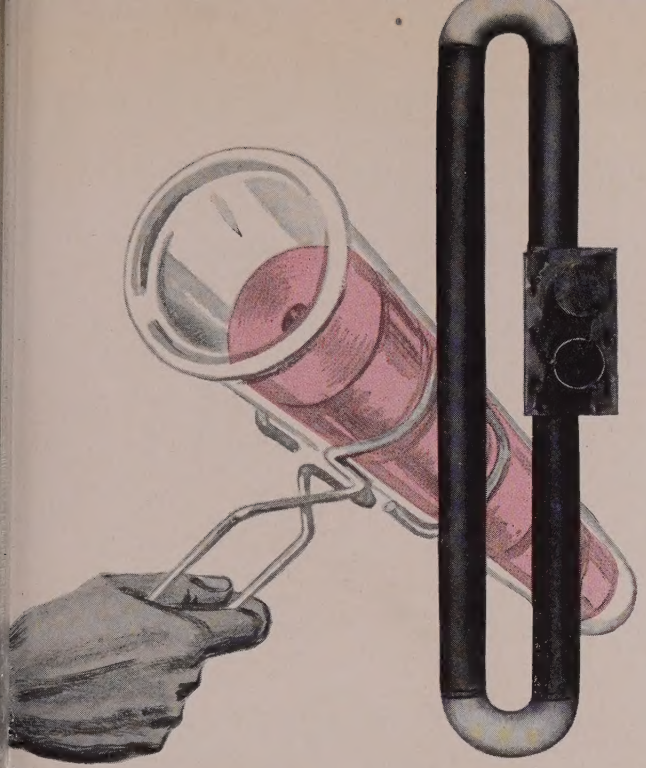
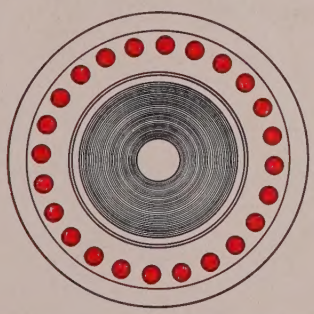
FLAT ROLLED AND BAR AND TUBE STOCKS AND PROCESSING SERVICES FROM 11 PLANTS



the test-tube that paid off in better annealing*

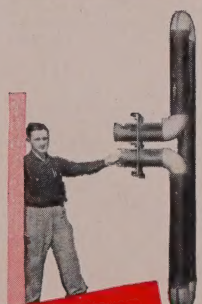
* Better, more uniform, faster, less expensive annealing. That's a big order. That was what Lee Wilson engineers had in mind when they set out to improve the radiant tube. After months of testing and dozens of designs the new "O" Tube was developed. It was tested by every known method, and has since received complete on-the-job testing in many leading steel mills. It's terrific! It promotes rapid combustion, presents a greater heating area. It is compact and efficient beyond expectations. It's the heart of the great new Lee Wilson Single-Stack Portable-Base Annealing System that has been an instant hit with basic metals producers everywhere.

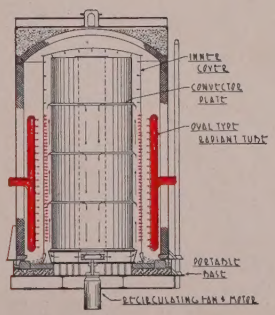
Compact design of "O" tube permits complete blanketing of inner cover



Note how charge receives heat equally from all sides

Design presents maximum heating surface for quicker heating





The entire portion of the tube is inside the furnace. No lost heat

e's more... et the re story write"...

Lee Wilson

ENGINEERING COMPANY, Inc.

20005 WEST LAKE ROAD, CLEVELAND 16, OHIO

New Fairless Works billet mill gets extra bearing capacity in same space

with TIMKEN® Balanced Proportion Bearings

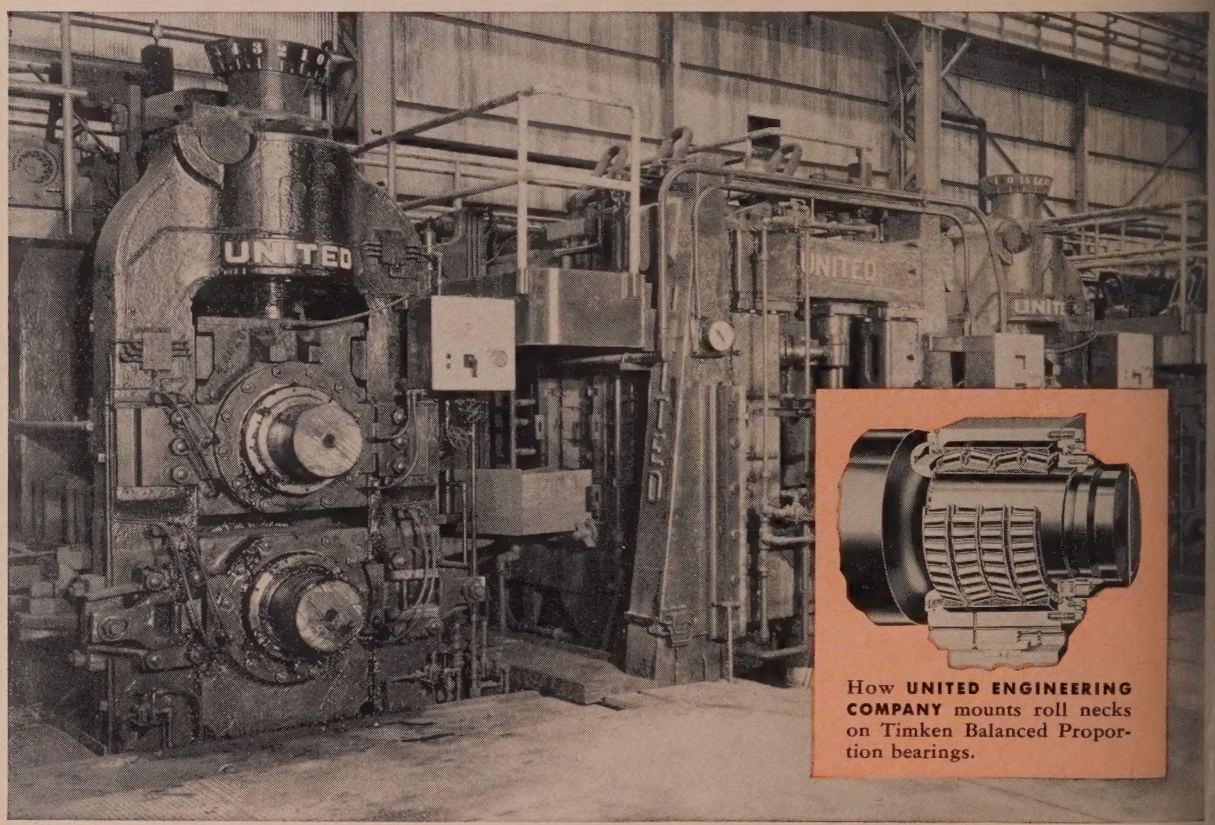
HERE'S another mill equipped with Timken® Balanced Proportion bearings—a new 10-stand billet mill at U. S. Steel's Fairless Works. These bearings are among the more than 3000 Timken tapered roller bearings used in the Fairless Works!

Timken Balanced Proportion bearings have load ratings up to 40% higher than the same-size bearings in the older design. In some mills, they increase bearing life expectancy almost three times! Moreover, Timken Balanced Proportion bearings make possible a 50 to 60% increase in neck strength which means greater rigidity and higher rolling precision.

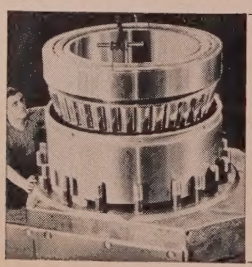
To make these truly significant improvements in an already good bearing design, Timken Company engineers made an exhaustive study of steel mill bearing requirements. Ultimately they developed the Balanced Proportion design. Rollers are longer, permitting higher loads—and thinner, permitting larger bores and stronger roll necks. Timken Balanced Proportion bearings have now been applied to numerous types of mills.

Timken tapered roller bearings are a sure sign of quality on the steel mill machinery you buy or build. Always look for the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **UNITED ENGINEERING COMPANY** mounts roll necks on Timken Balanced Proportion bearings.



ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

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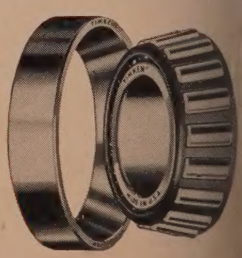
TAPERED ROLLER BEARINGS